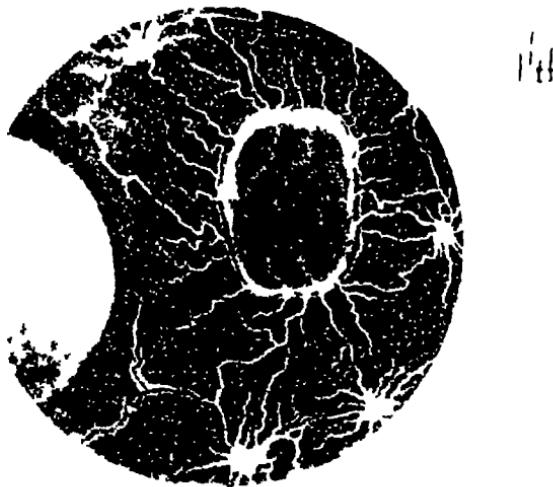


Fig. 1



Faecal ulcer of the rectum before treatment

Fig. 2



Healed faecal ulcer of the rectum

INTERNATIONAL CLINICS  
A QUARTERLY  
OF  
ILLUSTRATED CLINICAL LECTURES AND  
ESPECIALLY PREPARED ORIGINAL ARTICLES  
ON  
TREATMENT, MEDICINE, SURGERY, NEUROLOGY, PÆDIAT-  
RICS, OBSTETRICS, GYNÆCOLOGY, ORTHOPÆDICS,  
PATHOLOGY, DERMATOLOGY, OPHTHALMOLOGY,  
OTOLOGY, RHINOLOGY, LARYNGOLOGY,  
HYGIENE, AND OTHER TOPICS OF INTEREST  
TO STUDENTS AND PRACTITIONERS

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NEW ORLEANS

VOLUME III FORTIETH SERIES, 1930

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# A Clinical Symposium from the Fifth Avenue Hospital of New York City

## FREQUENCY OF MICTURITION AND PARTIAL LACK OF URINARY CONTROL IN WOMEN\*

By FREDERIC W. BANCROFT, M.D.  
New York City

MANY women suffer from frequency of micturition and partial lack of urinary control. Upon stumbling or sneezing there may be urinary leakage. The lives of other women are made miserable by having to void every hour or so during the day. These conditions are distressing, and for this reason it seems expedient to discuss two lesions which may be relieved by minor surgical procedures. These conditions are (1) oedema of the trigone, often associated with posterior urethritis, (2) partial or total laceration of the urethral internal sphincter muscle.

It is not the purpose of this paper to discuss frequency of micturition due to stones, cystitis, urinary infections, nor to pressure of tumors on the bladder.

The two subjects above have been frequently mentioned in the literature, but it has impressed the author that these conditions are not readily recognized by the practitioner, and that these women suffer a great deal of inconvenience through the lack of proper diagnosis and treatment.

*1. Oedema of the Trigone and Posterior Urethritis*—The pathology of this disease is not well known. I doubt if it has been studied microscopically, and it is only through the recognition of the symptomatology and the study of the cystoscopic findings that it has been recognized as an identity. Little is known of the etiology. Hunner has described the condition as secondary to ureteral stricture, prob-

\* From the Surgical Service of the Fifth Avenue Hospital, New York City

ably a continuation of the retroperitoneal inflammatory condition downward toward the base of the bladder, involving the trigone. It is also found in women who have had children wherein there is mechanical displacement of the neck of the bladder, as in cystocele associated with lacerated perineum and occasionally prolapsed uterus. However, it sometimes occurs in nullipara.

The question might be raised how or why an irritable trigone should stimulate desire for frequent micturition. One might well feel that such an irritation would cause spasm, which would result in suppression. The explanation of this phenomenon I believe has been found by Young. Following is a quotation from him:

We had noticed that in cases where there was urinary obstruction, the trigonal muscle was tremendously hypertrophied. Later, we observed during cystoscopy, in the case of a man who was suddenly seized with an imperative desire to urinate, that the trigone became much shortened and thickened. The posterior margin of the orifice was flattened out and disappeared, and the verumontanum rose up almost into the bladder, where it could be viewed. Our studies have shown that the trigone always contracts during micturition, and have furnished the first clear explanation of the act of urination. Our first published statement was as follows:

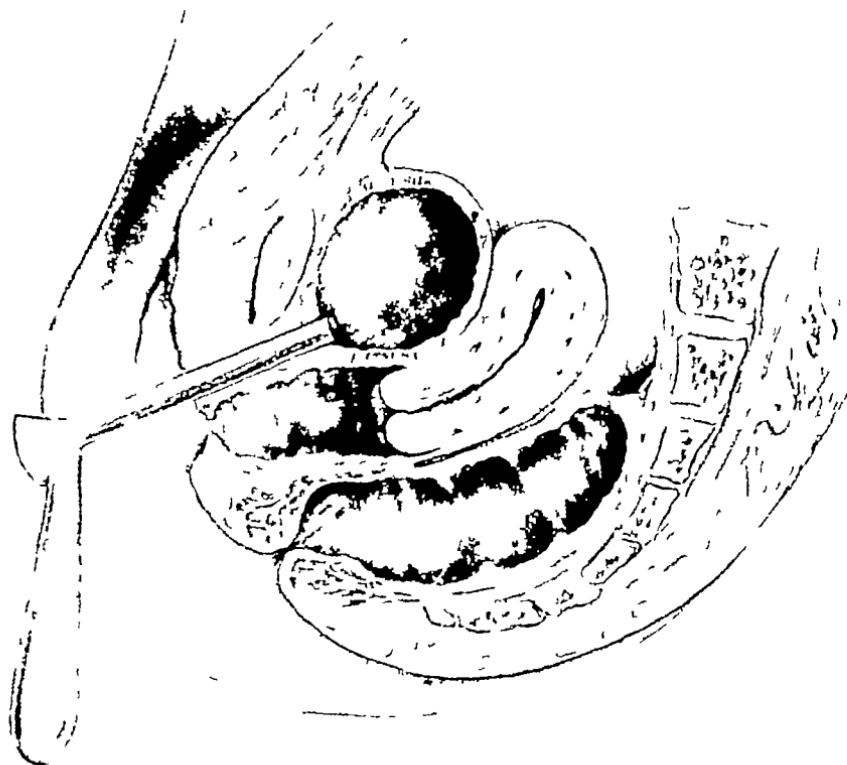
"This brings up the question of the part taken by the trigone in the act of urination. It seems to me to indicate that one function of the trigone is to pull open the internal sphincter of the bladder. I have long held to this view, as I have frequently observed during cystoscopy that if violent desire to urinate came on, the trigone would contract greatly and the prostatic orifice would open widely, the median (posterior) portion being apparently drawn backward by the muscle fibers which run from the trigone down into the posterior urethra, and which were seen to contract violently. The opening of the internal sphincter during urination will have to be viewed, therefore, not as an inhibitory action, as heretofore, but as the result of the contraction of the powerful trigone muscle which passes in the form of an arc through a weaker muscle of circular shape (the vesical sphincter) and pulls it open when it contracts."

The trigone muscle, running down into the urethra, forms an arc, the contraction of which straightens it and results in depressing the "uvula vesicae" and opening the vesical orifice. The opening of the sphincter is then positive, and not a relaxation due to "inhibition of the internal sphincter." This has been confirmed anatomically by Wesson, who has shown that the trigonal muscle pulls upon the orifice in the open side of the two sphincteric loops, and endoscopic views prepared by us in conjunction with Wesson show the orifice being pulled, by the backward and outward impulse of the trigonal muscle, into a triangular, widely open hole. In the few cases where the trigone, dissected free by tuberculous ulceration, has been removed surgically, there was difficulty of urination.



Knee-chest position to be assumed by patient in order to secure a proper air-distortion

Fig. 2



Kelly cystoscope inserted showing ease of exposure of trigone and posterior urethra after air dilatation of bladder

*Symptomatology*—Frequency of micturition is a common complaint. A woman comes to a doctor complaining of having to void frequently during the daytime but rarely at night when in bed. It may be associated with burning and a moderate degree of tenesmus. There is rarely any history of having passed blood. They frequently complain that if they do not void every hour or two hours they are in such discomfort they are unable to hold the urine. An examination of the urine shows numerous epithelial cells but rarely any leukocytes or red blood-cells. One may see, then, there are two main differences between this condition and cystitis. In cystitis the urine contains pus and bacteria, and the frequency of micturition is continuous throughout the day and night.

*Cystoscopic Examination*.—With a preliminary history and urine examination such as given above, and a negative X-ray picture for stone, a thorough cystoscopic examination with the usual electric water cystoscope of the Brown-Burger type may be advisable, but it is usually not necessary. The patient is put in the knee-chest position (Fig. 1) and a Kelly air cystoscope inserted as is shown in the illustration (Fig. 2), and the bladder allowed to dilate with air, when even the uninitiated may observe the trigone and posterior urethra. At such observation one sees often a reddened edematous appearance of the mucosa of the trigone. At times it will give the appearance of numerous small subepithelial cysts, or so-called cystitis cystica. On withdrawing the cystoscope so that the posterior urethra is shown, it appears fiery red in color, in contra-distinction to its normal pink appearance. It does not appear ulcerated, but gives rather a picture of acute hyperemia.

*Treatment*.—If we assume from our study of the symptomatology and pathology that this condition is usually due to some circulatory disturbance which produces a fairly marked hyperemia of the bladder neck and posterior urethra, treatment resolves itself into first, the relief of the primary cause—that is, if there is a ureteral stricture the stricture should be dilated. If there is a marked displacement of the pelvic floor, with laceration of the perineum and cystocele, these conditions should be repaired. If, however, there is no marked mechanical cause noted, great relief may be afforded by the local application, through a Kelly cystoscope, of dilute solutions of silver nitrate to the trigone and posterior urethra. Fulguration has

also been used but it may be followed by stricture. While the silver nitrate treatment is not always curative, it will usually relieve the patient of symptoms for weeks, months, and occasionally years, but there may be a recurrence—which may have to be re-treated. The patient is told to void, and is then placed in the knee-chest position. After cleansing the urethral orifice, 4 per cent novocaine may be injected into the urethra. If one has a conical Kelly urethral dilator the urethra may be primarily dilated. A No 8 or No 9 Kelly cystoscope is then inserted and the obdurator removed. With a light reflector one looks into the bladder. Then, with a long cotton applicator upon which a small amount of cotton is inserted, the trigone and posterior urethra are touched up—first with a 1 per cent. solution, and at subsequent treatments increasing the strength to a 5 per cent., solution of silver nitrate. These applications may be done about twice a week for five or six treatments. Usually at the end of this time the patient has so much relief that no further treatment is necessary save the dietary and medicinal aids which will tend to dilute the urine and make it nonirritating. Thirty grains of sodium citrate three times a day, given in association with plenty of water, will usually tend to make the urine bland.

Laceration of the sphincter urethra muscle is most frequently a sequel to a protracted difficult labor, where the head has impinged against the symphysis pubis. One can easily understand how the muscle may be torn or so traumatized that sclerosis and scar tissue degeneration of the muscle is the result. This condition has also followed operations for cystocele wherein the incision has been extended too deep, and too near the external urinary meatus, and a proper suture has not been made of the fibers of the muscle.

*Symptomatology*—As this lesion is usually a partial laceration of the sphincter, complete incontinence is rare. Most of the patients complain that if they sneeze or cough or stub the toe a spurt of urine occurs. It is usually not a complete emptying of the bladder. Also, if the bladder becomes too full and they are not able to evacuate immediately, the bladder may empty itself before they can reach a toilet. While this is not a condition of great seriousness, nevertheless, it is a very unsatisfactory and uncomfortable situation, for a patient is nearly always compelled to wear a pad, and in the

hot weather there may be a considerable amount of irritation of the vulva, and a noticeable odor

*Treatment*—Treatment is largely operative. At times relief has been temporarily afforded by the wearing of a Smith-Hodge pessary, which tends to press the urethra against the pubis. The operative treatment is simple but is not devoid of some risk. The risks are twofold (1) the incision may be made too deep and a urethra-vaginal fistula may result, (2) the sutures may be inserted so tightly that either a stricture or a complete suppression results. I have recently seen a patient who had this operation performed where the sutures were put in too tightly and she had to be catheterized. Later, operation to repair this condition resulted in a vesico-vaginal fistula, for which she had had several operations until eventually a cure resulted. If the operation is properly done the result is instantaneous in affording complete relief.

*Operative procedure*—In this country Kelly's name has been given to the usual operation that has been devised. The following is Kelly's description of the operation:

The patient is in a lithotomy position, slightly elevated, the posterior wall of the vagina is retracted, and the area at the neck of the bladder brought down by means of forceps or four tension sutures. A Pezzer catheter with a stem not over five millimetres in diameter is introduced into the bladder.

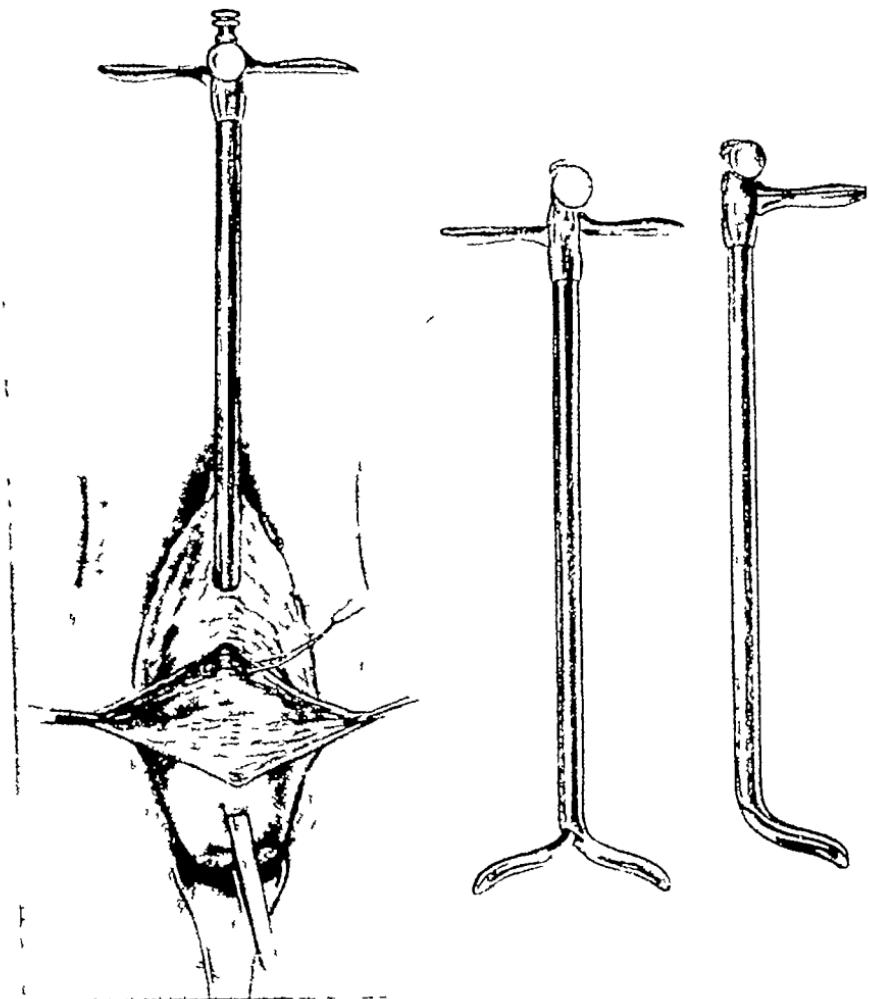
The next step consists in slitting the anterior vaginal wall in the median line for about five to seven centimetres, down to the urethra and the bladder, the neck of the bladder falling at about the center of the incision. The position of the bladder sphincter is easily determined by feeling the head of the catheter. Care should be taken not to cut into the urethra or the bladder. After making this median incision, the vagina is widely detached on both sides with tissue forceps and scalpel or a blunt dissector and dissected away for a distance of two to two and one half centimetres on each side around the neck of the bladder, freeing at the same time the upper half of the urethra. This is done with blunt pointed scissors pushing their way into the tissues. The dissection ought to be deepest at the vesical neck. As a rule, the bleeding is only moderate. With the detachment of vagina from bladder completed, the finger should be able to grasp about two thirds of the neck of the bladder with its contiguous urethra. Sometimes the bladder is so thin in the median line, due to the rupture of its muscle fibers in labor, that the mucosa shines through.

The control is now secured by sewing together the torn or relaxed tissues at the vesical neck with two or three mattress sutures of fine silk or linen passed from side to side, the first suture, turning in about one and one half centimetres of tissue, is tied at once and left long to be used with care as a tractor, the next is applied on the outside of this, further contracting and drawing together the tissues at the neck. The mushroom catheter should be removed.

just before tying the first suture. The more or less redundant vaginal walls, which have been detached in order to expose the sphincter area, are now resected so that the remaining tissues can be snugly brought together from side to side, thus supporting the vesical area operated upon and avoiding dead space between bladder and vagina, as well as making pressure upon the upper urethra somewhat constricting and supporting it. This suturing is best done with a continuous fine chromic gut suture in several layers. It is also often found advisable to repair a relaxed posterior vaginal outlet, putting in a strong floor of support."

I have successfully performed this operation about six times, and used a modification which I think simplifies the procedure and makes it a little easier for the operator. The introduction of a small Young's prostatic tractor (see Fig. 3), and then spreading the prongs and pulling it outward so that the prongs impinge on the bladder-neck, using the pubis as a fulcrum and placing the shaft of the instrument against it, will bring the urethra nearer the operative field. I have found it is not necessary to make quite as wide an exposure as Kelly has described. One may make about a three centimetre incision, dissecting laterally about one to two centimetres, exposing the muscle in the region of the bladder neck. One or two mattress sutures of chromic catgut are then placed, as shown in the illustration, in the retracted tissues of the sphincter muscle. These are drawn tight but not tied, in order to determine whether or not they will create a closure of the muscle. When this has been determined upon, the wings of the Young's prostatic tractor are closed, and the instrument removed. The sutures are then tied and a second supporting fascial stitch of interrupted chromic sutures applied. Over this the mucosa is sutured. In the postoperative treatment it may be necessary to catheterize the patient two or three times. If no other operative procedure has been done beyond the suturing of the sphincter muscle I have allowed a patient to sit in a hot sitz-tub to attempt to void urine, rather than to use a catheter. After seven or eight days in bed she is allowed up and shortly thereafter discharged from the hospital. In my six cases the results have been satisfactory and it has seemed to me a very satisfying operation, with a marked benefit to the patient.

FIG 3



Repair of internal sphincter muscle with Young's prostatic tractor inserted into bladder  
Instrument pressed against symphysis showing exposure thereby Insertion of first suture in  
muscle



## THE SURGICAL CONSIDERATION OF ACUTE LYMPHADENITIS

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ACUTE inflammation of the lymph-nodes is of common occurrence and the majority of the cases do not have to be considered from a surgical standpoint. When suppuration takes place, or when it becomes inevitable, medical treatment will not avail, however, and some form of surgical intervention becomes necessary. A study of the records of any general hospital or out-patient department will show that acute suppurative lymphadenitis is very common, yet little appears in the literature about it and even the text-books are apt to pass it by with only a word. To be sure, some cases will do well with little or no treatment, but, on the other hand, many cases are of sufficient severity to need hospital care, and may even threaten a fatal outcome. A discussion of the surgical aspect of acute lymphadenitis would therefore seem timely. In this article no attempt will be made to consider the intra-abdominal or intrathoracic lymph-nodes. They are of sufficient importance to warrant independent discussion.

*Anatomy*—The terminology *lymph-node* is used in preference to *lymph-gland* so as to avoid confusion with the salivary and other true glands which have the same names. The lymph-nodes most frequently involved in suppuration are those of the head and neck, those of the axilla, and those of the groin. The nodes around the knee and elbow suppurate only occasionally.

The important lymph-nodes of the head are the anterior auricular and parotid nodes, the posterior auricular or mastoid nodes and the occipital nodes. When these nodes are involved, the source of infection should be sought in the scalp, upper part of the face, or auricle, and perhaps in the skin of the back of the neck. The anterior auricular nodes lie both superficial and deep to the fascia covering the parotid salivary gland. They receive drainage from the frontal and temporal regions of the scalp and from the region around the

eye, nose, and ear. The parotid lymph-nodes are embedded in the parotid salivary gland and receive drainage from the posterior part of the nose, the soft palate, the external acoustic meatus, and the tympanum. The posterior auricular nodes lie over the mastoid process and origin of the sternomastoid muscle. They receive afferent lymphatics from the posterior part of the parietal region of the scalp and from the mesial surface of the auricle. The occipital nodes lie in the deep fascia covering the upper part of the trapezius muscle. The occipital artery, passing between the sternomastoid and trapezius muscles, pierces the deep fascia to enter the superficial fascia of the scalp in the neighborhood of these lymph-nodes. The afferents of the occipital nodes drain the occipital region of the scalp and the superficial portions of the upper and back parts of the neck.

The lymph-nodes of the neck are the most important that we have to consider. They are the most numerous, the most frequently affected, and bear intimate relation to important structures in the neck. Of these the submaxillary group, the retropharyngeal group, the submental group, and the deep cervical group are the most noteworthy. For the sake of completeness there should also be mentioned the superficial anterior cervical nodes around the anterior jugular vein, and the deep anterior cervical nodes below the hyoid bone and around larynx and trachea. The retropharyngeal nodes are embedded in the fascia behind the upper part of the pharynx and receive drainage from the nasopharynx, the posterior part of the nasal cavities, the auditory tube, and the tympanum. When they suppurate they give rise to a retropharyngeal abscess. The submaxillary lymph-nodes lie under cover of the deep cervical fascia at the angle of the jaw between the lower border of the mandible and the submaxillary salivary gland. One or two lymph-nodes lie inside the capsule of the submaxillary salivary gland. These nodes receive drainage from the side of the nose, the upper lip, the lateral part of the lower lip, the anterior third of the lateral border of the tongue, the gums, the submaxillary and sublingual salivary glands and the adjacent parts of the floor of the mouth. The marginal mandibular branch of the seventh nerve lies just above these nodes and the external maxillary artery lies deep to them. If the nerve is cut during an operation on these nodes a disfiguring drooping of the corner of the mouth will result. The submental lymph-nodes lie

under the chin between the anterior bellies of the two digastric muscles. They receive afferent lymphatics from the middle part of the lower lip, the adjacent gums, the tip of the tongue, the anterior part of the floor of the mouth, and the skin beneath the chin. They are not in intimate relation with any important structures. The deep cervical nodes lie under cover of the sternomastoid muscle in both the anterior and posterior triangles of the neck, and may be divided into a superior and inferior group. The superior group extends from the lower border of the parotid salivary gland down to the point where the omohyoid muscle crosses the internal jugular vein. They receive lymphatics from most of the nodes that have been mentioned above and hence receive drainage from the nose, the mouth, the tongue, the pharynx, the tonsils, the larynx, and the salivary glands as well as from the thyroid and the interior of the cranium. The upper lateral members of this group are in relation to the eleventh nerve as it passes under the posterior belly of the digastric muscle and enters the sternomastoid muscle at about its middle. The nerve then passes out of the muscle at its posterior border at the junction of the middle and lower thirds and may again come in contact with some of the lower nodes. This nerve supplies the sternomastoid and trapezius muscles and its preservation is therefore of utmost importance. The other lymph-nodes of this group are in intimate contact with the internal jugular vein, one large node which is a frequent site of inflammation lying at the junction of the common facial vein and the internal jugular. The inferior deep cervical lymph-nodes, often known as the supraclavicular nodes, are situated along the internal jugular vein below the omohyoid, and extend out into the subclavian triangle. They receive some drainage from the nodes around the trachea but most of their afferents come from the thorax. They are more apt to be the seat of carcinomatous metastases than of inflammation.

The axillary lymph-nodes consist of several groups in the general vicinity of the axilla. The lateral or brachial group lie in the lateral part of the axillary space along the course of the great axillary vessels. They receive drainage from the upper extremity. The anterior or pectoral group extend from the third to the sixth intercostal spaces between the lower border of the pectoralis major and the serratus anterior. Their afferents

above the umbilicus and from the outer two-thirds of the breast. The central axillary nodes lie in the central part of the axilla along the course of the intercostobrachial nerve. Their afferent lymphatics are the efferents of the lateral group and the subscapular group. Hence these lymph-nodes may be infected from the upper extremity, chest wall, or back. The other groups, *viz.* the subpectoral, infraclavicular, deltopectoral, and interpectoral nodes are named from their location. They do not often suppurate.

The lymph-nodes of the region of the groin may be divided into superficial and deep. The superficial inguinal lymph-nodes are scattered nodes lying above the inguinal ligament and draining the lower abdominal wall. The superficial inguinal lymph-nodes are strung along the inguinal ligament down to the saphenous opening and proximal part of the great saphenous vein. In order, from above downwards, they drain the lower lateral abdominal wall, the buttocks, the proximal and lateral part of the thigh, the anal canal, the perineum, the pubic region, the scrotum and penis in the male and the vulva and lower part of the vagina in the female, and the lower extremity except the lateral part of the foot, the heel, and a part of the posterior aspect of the leg, these localities sending their drainage to the popliteal nodes. The deep subinguinal nodes lie in the femoral trigone and in the femoral canal. Their afferents are the efferents of the nodes just mentioned and in addition they receive drainage from the deeper parts of the penis or clitoris.

This anatomical description does not cover all the lymph-nodes in neck, axilla, and groin. There are others scattered about in these localities. The lymph-nodes described, however, are those most likely to become infected.

*Etiology*—Acute inflammation of the lymph-nodes is, except in unusual conditions, secondary to infection in the area drained by these nodes. Often the original infection has cleared up but a history of previous infection may be elicited. It should be borne in mind that the infection may be so slight that it is overlooked, a condition common in pediculosis where the infected areas in the scalp are small and hidden by hair. An external otitis causing lymphadenitis of the parotid nodes is frequently unnoticed and mumps has been incorrectly diagnosed when the underlying infection was hidden in the external auditory canal. Inguinal lymphadenitis occasionally

presents difficulties. Infection here is so commonly associated with genital infection that this source is usually sought first and the patient wrongly accused of a urethritis when the real cause may lie in an epidermophytosis between the toes, or in a small pimple on the buttocks. Usually the cause is easy to find. Infection of the cervical lymph-nodes is by far the most common lymphadenitis and is mostly secondary to infections of the nose, throat, or mouth. So common is inflammation of the lymph-nodes of the neck in acute tonsillitis, the nose and throat infections of the acute exanthemata, and in infected teeth that it is considered a part of these diseases rather than as a complication. Fortunately the lymphadenitis generally subsides with the subsidence of the underlying cause and suppuration is the exception rather than the rule. A fact to be remembered is that nodes primarily draining an area discharge their lymph to deeper nodes which may become inflamed while the first nodes escape. Whatever the condition in the lymph-nodes, it is of the utmost importance to locate the original focus, and if the anatomy of the lymphatics is borne in mind this focus should be found.

*Pathology* — The morbid process that takes place in acute inflammation of the lymph-nodes is essentially that which takes place in any acute inflammatory process. The sequence is congestion, oedema, swelling, round-cell infiltration, polymorphonuclear infiltration, necrosis, and suppuration. The round-cell infiltration may be so intense that a study of the microscopic section may lead to a mistaken diagnosis of lymphosarcoma. It is unusual for the process to stop at this point, however, and the condition either resolves or progresses to the more advanced stages of inflammation. The polymorphonuclear cells appear first in the center of the node and when suppuration takes place it likewise starts in this location. Thus pus will be found in the center of the node before the periphery has broken down, a condition which explains the persistent drainage when incision is made too early. When a node located under a strong fascial sheet breaks down and suppurates the fascia may cause so much resistance that the pus, instead of coming to the surface, will burrow underneath the fascial planes to form a deep abscess before fluctuation can be detected on the surface. Suppuration of the occipital nodes is prone to develop such an abscess and many of those dangerous deep abscesses of the neck can be explained on this basis. T. J. ...

then an acute inflammatory process of the surrounding cellular tissues superimposed on that of the lymph-nodes

*Incidence*—Suppurative lymphadenitis has its greatest incidence in children who develop it in the cervical nodes as a result of acute conditions of the nose, throat, or ears, either in conjunction with the acute exanthemata or independently. In our cases at the Fifth Avenue Hospital, the children outnumber the adults in a proportion of three and one-half to one. The vast majority of the cases in children involve the cervical lymph-nodes while in adults the cervical and inguinal nodes are about equally involved. The relative infrequency of suppurative axillary lymphadenitis is curious. Infections of the fingers, hands and arms are common. Furthermore, the axillary nodes are numerous and drain not only the upper extremity but also the chest wall and back, especially the breast. Yet most of our cases of axillary lymphadenitis were caused by infected vaccination wounds, the others being caused by infections of the hand. Breast abscess was not responsible for a single case of suppurative lymphadenitis in the axilla. The cervical nodes most frequently involved are the submaxillary and the upper deep cervical (Fig. 1). The occipital nodes are next. The apparent infrequency of submental node involvement can be explained on the basis that these nodes are superficial, make a localized abscess when they suppurate, and the patients are treated in the office or out-patient department and so do not get into the hospital records. The cases of inguinal lymphadenitis were much more common than those of axillary lymphadenitis. The source of inguinal infection was chiefly the buttocks and anal region. Here again our figures must be taken with reservation because gonorrhreal urethritis is not accepted as a hospital case.

*Symptoms and Signs*—The symptoms and signs of acute inflammation of the lymph-nodes are well known. There is a tender swelling of the affected lymph-nodes and at first the outline of the node can easily be determined. Later the swelling increases and becomes diffuse with the involvement of the neighboring nodes. At the onset the skin is not reddened but when the swelling becomes diffuse the skin takes on a red tinge which deepens and becomes angry in appearance when the node begins to break down. Fluctuation can be demonstrated later. It first appears as a small spot of softening and in twenty-four hours or more the fluctuation can be readily elicited.

FIG 1



Acute suppurative lymphadenitis of submaxillary nodes

FIG 2



Acute suppurative lymphadenitis with delayed suppuration and illness prolonged by too early incision. Scars of two incisions seen just above abscess.

While breaking down of the node commonly produces fluctuation, it must be remembered that when the involved lymph-node lies under strong fascia, suppuration may take place without demonstrable fluctuation. Meanwhile, the patient becomes increasingly uncomfortable. Movements of the neighboring muscles are painful and these muscles splint the part in the attitude that affords the least discomfort. Fever is commonly found, especially in children who may sometimes have a temperature as high as 105° F., although the usual range is between 101° and 103°. In adults the fever is less.

*Differential Diagnosis*—Acute suppurative lymphadenitis is seldom confused with any other condition. The hot, red swelling with a history or evidence of acute inflammation in the parts drained by the infected glands usually admits of no other diagnosis. The deep suppurations occasionally afford some difficulty in diagnosis, but the history of antecedent infection, the fever, the toxic state of the patient, and the tense swelling with edematous overlying skin should serve to identify the condition.

Ludwig's angina may be confused with suppuration of the deep cervical nodes. This is a cellulitis of the floor of the mouth and the neck due to an infection between the mylohyoid and hyoglossus muscles and characterized by severe prostration, board-like swelling of the neck, and upward displacement of the tongue. Dyspnea, dysphagia and trismus are marked signs which are not prominent in suppurative lymphadenitis, and fluctuation does not occur. In the vast majority of the cases an infected tooth is the cause. Some investigators have considered it a lymph-node infection, but Ashhurst, in a recent article, has shown pretty conclusively that the lymph-nodes are not responsible.

Hygroma, thyroglossal cysts, or branchiogenic cysts of the neck, especially when the seat of a secondary infection, may be mistaken for acute lymphadenitis. They fluctuate, and, when infected, the overlying skin is red and tender. The long history, the absence of preceding infection, and the mild general symptoms, or lack of them, should differentiate the condition.

Tuberculosis of the lymph-nodes often causes some confusion. This was once a common disease but with better hygienic conditions, more careful supervision of the milk supply, and more frequent tonsillectomies it is no longer encountered so often. The tuberculous

node is swollen for weeks or months before it breaks down into a cold abscess. It is tender only when involved in a secondary infection, and does not produce the systemic toxemia of the acute infections. Even when some focus such as diseased tonsils can be demonstrated, the local signs are much less prominent than are found with an acutely infected node of the same size.

Syphilis, especially in the primary or secondary stages, causes a considerable lymphadenitis. Careful search will show the chancre or secondaries and if doubt still exists the Wassermann test will dispel it.

The nodes of German measles do not suppurate and the rash which appears in a day or two will make the diagnosis. Glandular fever and bubonic plague are apt to occur in epidemics which should serve to identify them, even if their severe toxemias do not. Carcinomatous metastases, lymphosarcoma, Hodgkin's disease, and leukemia lack all the characteristics of acute lymphadenitis except the swelling, and in addition have their own special identifying features.

Axillary furuncles often are wrongly termed lymphadenitis. When the infection develops in the bottom of a hair follicle or sebaceous gland the pus finds less resistance in the loose subcutaneous tissue than in the skin. Hence there may be a fair-sized abscess before the swelling fluctuates, but even so the cavity is seldom as deep as the lymph-nodes.

*Treatment*—The treatment may be divided into three stages first, the treatment of the focus, second the treatment of the lymph-nodes before suppuration, and third, the treatment of the lymph-nodes after suppuration. Of primary importance is the treatment of the focus. There is such a multiplicity of infections that can cause acute lymphadenitis that it is not possible to go into the details of the therapeutics. Suffice it to say that the focus must be determined and the appropriate treatment instituted, and this treatment may involve the specialties of nose and throat, pediatrics, oral surgery, dermatology, urology, and many others. Where the primary infection is surgical, drainage must be established and maintained. Unless the underlying cause is found and treated a cure of the lymphadenitis cannot be expected.

Before suppuration has taken place the treatment is largely that of the symptoms. Rest in bed and analgesics are valuable adjuncts.

Heat or cold may be used locally according to which affords the most relief. Local applications of ichthyl or similar preparations are of psychic value only. Iodine is to be condemned. It does no good and can do much harm by causing an iodine dermatitis or burn which only serves to complicate the situation. Massage is contra-indicated. The custom in vogue among many physicians of giving the patient some dirty, malodorous ointment to rub into the swelling is pernicious. The condition is an acute inflammation. Ointments applied locally cannot possibly reach the infection and the massage only serves to spread it. In the non-suppurating stage of the infection the treatment should be directed to the focus and only such other treatment used as will promote the comfort of the patient. When suppuration becomes inevitable heat will hasten the process and will afford relief. It may be applied in the form of poultices, hot-water bag, or any of the forms of radiant heat.

When suppuration has become established, the condition requires incision and drainage. Great care must be exercised in selecting the proper time for incision. In the consideration of the pathology of the disease it was pointed out that pus exists in the center of the lymph-nodes before the periphery has become necrotic. Incision at this time will probably produce some pus but will also result in a sinus that drains interminably, and will usually require another incision later. Meanwhile, the patient is just as uncomfortable as he was prior to the operation, if not more so. The time for incision is when the nodes are completely broken down and this can be determined by the presence of fluctuation over the greater part of the involved area. It may be necessary to wait two weeks or more for this to take place but if postponed till the proper time the abscess can be drained through a small incision, healing will take place promptly, and the relief will be immediate and lasting. A study of our cases shows that the length of postoperative treatment was in inverse proportion to the duration of the ante-operative symptoms. Almost invariably a pre-operative duration of symptoms of less than a week resulted in a postoperative stay in the hospital of two or three weeks with subsequent dressings in the office or out-patient department. On the other hand a pre-operative course of a week or two meant a postoperative stay of only a few days and seldom over a week. Hence the rule is to wait for well-defined fluctuation before making an incision.

Fig 2 illustrates the futility of early incision. The child developed an acute lymphadenitis secondary to a running ear which was incised by a local physician before fluctuation appeared. A second incision was made a few days later with no improvement of the condition. Two weeks after the onset of the swelling the child was admitted to the Fifth Avenue Hospital. There was a hard swelling involving the left side of the neck, in which were two small incisions discharging a slight amount of thin pus. The left ear was swollen but not discharging and next day erysipelas developed. The erysipelas responded promptly to serum treatment, the incisions ceased to drain and healed, but the swelling only partially subsided. Fluctuation appeared two weeks later, at the time of the taking of the photograph. A small incision was then made in the abscess, about ten cubic centimetres of pus evacuated, and the child discharged from the hospital three days later. At this time the swelling had subsided and the wound was nearly closed. Had the first incision been made at the proper time the child would have been spared three weeks of hospital care, and probably an attack of erysipelas.

The one exception to the rule of waiting for fluctuation is when the abscess is under dense fascia. Under these circumstances incision must be made before fluctuation is prominent. The guide to the proper time for incision in these cases is the duration of the symptoms, the severity of the local reaction, and the amount of general toxemia. A patient who has been developing for over a week a large, tense, painful swelling in a locality where there are known to be deep lymph-nodes, who is running a high temperature, and who is toxic merits an incision, provided that no other cause for the symptoms can be found. This is the only type of case where incision is warranted before fluctuation.

Excision of the involved nodes is recommended by some, but it is questionable surgery at best. It may be necessary when the nodes become so large that they press on important structures but it should not be done otherwise. Either the nodes will suppurate and can be opened in the accepted manner at a later date, or they will subside and not require operation. This, of course, refers only to acute lymphadenitis.

The incision should be small (half an inch is ample), and made over the most dependent part of the fluctuation. After the skin and

superficial fascia have been penetrated, a blunt-ended clamp should be pushed into the abscess cavity and opened. This may be sufficient but it is a good plan to enlarge the incision sufficiently so that the little finger can be inserted into the cavity to explore its position and break down any septa that may be found. If exploration shows the cavity to extend below the incision for any distance a counterincision can be made with the finger in the cavity as a guide.

In the groin and axilla the incision can be made to conform to the surgical requirements. In the neck the cosmetic effect of the scar has to be considered, as well as the important anatomic structures that must be avoided. The incision should be transverse and parallel to the creases in the neck. If a submaxillary abscess is to be opened the incision should be a finger's breadth below the ramus of the mandible. In this way both the facial artery and the mandibular branch of the seventh nerve will be avoided. If the abscess is deep the incision should be larger and the important structures and landmarks identified. When this is done the clamp can be pushed into the suspected spot and opened when pus is encountered. The finger can then be inserted and such other incision made as the case warrants. Blindly cutting down to a deep abscess will probably result in injury to an important vessel or nerve. A consideration of the anatomy of the region will indicate what structures are to be avoided.

If the abscess is opened at the proper time little in the way of drainage will be required. A piece of rubber dam will usually suffice. When the cavity is large and irregular, some surgeons like to pack it very loosely with narrow vaseline gauze packing. If this is used, the skin incision must be sufficiently large to permit free exit of the pus around the drain. Such a drain must be removed in twenty-four hours, as after that time it acts more as a cork than as a drain. When counterincision is made, a seton drain, composed of four or five strands of silkworm gut, is very efficient. It should go in one incision and out the other with the loose ends tied together to make a circlet. This will usually provide ample drainage, does not become soiled with pus, does not have to be changed, and can be easily and painlessly removed when it has served its purpose. Except in unusual cases all drains can be removed in seventy-two hours.

When properly made, these incisions heal promptly and in the course of six months or so will be almost invisible. The adherent, un-

sightly scars usually result from opening cold abscesses which may drain for weeks. Should a cold abscess be opened by mistake for an acute abscess it is better to complete the operation by curetting out the abscess cavity and dissecting out the underlying tuberculous nodes which are usually present and easily overlooked. The wound can then be closed without drainage except for a small seton to take care of the exudation into the resulting dead space.

#### CONCLUSIONS

1 Acute suppurative lymphadenitis is a common condition due to an infection in the region drained by the suppurating nodes.

2 Children are the chief sufferers from this condition and in them the cervical nodes are the most frequently involved. In adults the nodes of the groin and of the neck are about equally involved. The axillary nodes suppurate less commonly.

3 The treatment should first be directed to the site of the original infection. When the lymph-nodes suppurate, the treatment is surgical.

4 Surgical treatment consists of incision and drainage but only after fluctuation takes place, except when a dense fascia overlies the suppurating nodes. In this case incision can be made before fluctuation appears.

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## THE INFECTED CERVIX\*

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To discuss the above topic, with the object of assisting the general practitioner and those doing a moderate amount of obstetrics and at least office gynecology, we will consider the infected cervix from the following aspects

- (1) As a focus of infection,
- (2) as a factor in sterility,
- (3) as a cause of dystocia,
- (4) as a cause of morbidity postpartum, early and late, and
- (5) as a pre-malignant menace

We will also briefly outline the treatment, prophylactic and curative, both operative and non-operative, and in this discussion bring out some points of interest in the comparison of surgical and non-surgical methods

There is probably no form of infection more frequently overlooked than an infective cervicitis and endocervicitis as a causal factor in both local and remote pathology and symptomatology. This is due because

- 1 It is too readily assumed by the physician that unless there is a definite history of neisserian infection, abortion, or one or more labors, the cervix is automatically ruled out
- 2 There is great difference of opinion among female patients as to what constitutes abnormality in the amount and character of leucorrhæal discharge and what constitutes proper physical hygiene in regard to cleanliness of the vulva and vagina
- 3 The tendency is to accept the patient's story in excluding the cervix as a focus of infection and carefully to examine tonsils, sinuses, gall-bladder and intestinal tract, whereas the cervix is frequently both the source of infection unknown to the patient and the cause of prevarication if there is an infection known to the patient

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Local pathology with its distressing symptomatology not only includes the profuse irritating cervical discharge but the heavy, tender uterus causing dyspareunia, pelvic congestion with its backaches, and congestive type of dysmenorrhea.

The remote symptoms refer to the general lassitude and easily tired individual subject to neuritis, pyelitis and cystitis in addition to the nervously depressed woman suffering from insomnia, headache, constipation and allied symptoms.

No accurate knowledge of the cervix can be elicited without visual inspection through a vaginal speculum. Digital examination gives definite knowledge as to tenderness of the cervix and associated pelvic pathology, but direct vision is essential to knowledge of the extent, character, and probable cause of cervical pathology.

Cleansing of the external os and cervical canal is probably best accomplished by cotton swabs and caroid powder which rapidly dissolves the tenacious mucus and exposes the true underlying condition of the mucous membranes.

*Factor in sterility*—As a factor in sterility, the infected cervix plays an important part. An infected mucous plug of the cervical canal acts as an effectual cork in excluding the spermatozoa, alters the normal alkaline cervical discharge in character until it is distinctly inimical to the life of the spermatozoa, and, more important still, is the source of infection which by continuity of tissue leads to salpingitis and occluded tubes, and this is not only true of neisserian infection but of the *Staphylococcus* and *B. coli*.

Mazer and Hoffman state that "Most of the cases of female sterility are due to gonorrhreal cervicitis and salpingitis, although cervical laceration with subsequent infection play no unimportant part, chronic endocervicitis without involvement of the tubal lumen is the third in frequency."

Sterility in the presence of an infected cervix cannot safely be further investigated until the cervical infection has been controlled. Any intra-uterine manipulation, and particularly the Rubin test under these circumstances, is not only immediately hazardous but may cause the eventual sealing of fallopian tubes now patent.

*As a cause of dystocia*—We must consider both the cervicitis and endocervicitis untreated and the dystocia due to a pathologic cervix resultant from treatment.

Cervical dystocia (in other words, a non-dilating, slowly dilating or incompletely dilating cervix) may be due to a spasmophilia caused by a tender, painful, inflamed cervix or an anatomically non-dilating cervix due to scar tissue and fibrosis, either the result of laceration and infection or the result of treatment of these conditions, whether this treatment be chemical or thermal cauterization or plastic surgery.

*As a cause of morbidity postpartum (early and late)* —The cervix eroded, ulcerated, and infected before and during a pregnancy even though the infection is quiescent or arrested during the period of pregnancy is frequently redeveloped after the injury due to spontaneous dilatation and passages of the foetus, and, of course, in a larger degree if the added trauma of bagging, manual dilatation, forceps deliveries and other intracervical manipulative procedures are performed.

While Hofbauer has shown the presence of protecting phagocytic tissue around the cervix before and during labor increased in the presence of infection, undoubtedly many of the moderate postpartum temperatures are attributable to cervical infection and the fairly frequent metritis and parametritis and the occasional broad ligament abscess are directly traceable to the previously infected cervix.

The bacteremias we believe are not usually due to preexisting cervical pathology but pathogenic organisms more readily gain access to the blood-stream when introduced into the vagina by faulty technique if aided and abetted by an already inflamed and infected cervix with its lowered resistance to bacterial invasion.

*As a pre-malignant menace* —An ulcerated, infected, or even eroded, cervix cannot be ignored as a causal factor in carcinoma of the cervix.

According to H. C. Bailey the recognized constant factor in a cervix before definitely malignant pathology is recognizable is an unhealed surface constantly bathed by an infected discharge.

Large series of cases of cervical carcinoma point conclusively to the comparative frequency of cervical malignancy following frequent abortions, instrumental delivery before complete cervical dilatation, untreated chronic cervicitis, irritating douches, harmful contraceptive devices and irritations of stem-pessaries.

Cervical carcinoma is more frequent in married women who do

not observe proper vaginal cleanliness by douching and this frequency increases in the women who have had abortions and deliveries with either spontaneous or instrumental cervical injury and infection and where cleanliness and mild disinfection is ignored.

Cervical cancer is preceded by pregnancy in 90 per cent of the cases. The important factor is *not* the cervical injury but the following inflammation, irritation and infection.

Treatment of the infected cervix may be considered under the usual headings of prophylactic and curative.

Before labor or even pregnancy or definite infection care should be given to vaginal hygiene and proper cleanliness.

Frank K. Smith, in an interesting comparison of facts elicited from 500 patients with cervical cancer and 500 patients with other gynecologic conditions, found cancer decidedly more frequent in married women who did not maintain vaginal cleanliness by douches, and further found that of all the cases who took douches cancer was considerably less frequent in those using mild douches, such as saline, sodium bicarbonate, plain water or potassium permanganate, and considerably more frequent when stronger, more irritating solutions were used, as mercury bichloride, phenol and iodine.

In addition to cleanliness and healing of slight erosions and the curing of leucorrhea, the more gentle handling of the cervix during labor is a most important factor.

The problem of injury to the perineum during labor has been solved to a great extent by the various types of episiotomies properly timed, placed, executed and repaired, and the problem of the cervix is nearing solution with more attention being paid to the first stage of labor, the more frequent use of morphine and other analgesics, and the less frequent attempts at delivery before cervical dilatation is complete.

Another thought along prophylactic lines is the advisability of routine cauterization of the cervix in all cases of sub-total hysterectomy. Mayo reports twenty-five cases of carcinoma of the cervix subsequent to supravaginal hysterectomy while Curtis claims that cancer of the cervix never occurs in a cervix thoroughly cauterized.

It is my custom to always cauterize either from below before opening the abdomen under gas, if ethylene is to be given, or from above through the stump of the cervix after the uterus has been

removed I believe the vaginal route to be advisable as it can be done accurately under direct vision and the cauterization up to and through the internal os is an added point to the safety of the abdominal technic

The curative treatment of infected cervices with or without laceration has, in the main, been reduced to (1) thermal cautery, (2) plastic surgery

To be sure, cleansing douches, depleting tamponage, the topical application of iodin, silver nitrate and other caustics are occasionally indicated, but for definite curative results, the majority of cases will come to either cauterization or surgery, and, occasionally, to both

In a certain group of extensive cases cauterization may only partly suffice, and, due to bleeding or severe reaction of the patient to pain, surgery may be indicated following attempted cauterization Again, the writer has seen more than a few cases which needed cauterization following unsuccessful or but partially successful plastic surgery

Surgical treatment of the lacerated infected cervix in women past the child-bearing age consists, by general agreement, of some form of amputation after the methods of Sturmdorf, Emmet, or Shroeder

During the child-bearing period, there are many exponents of the trachelorrhaphy as practiced for many years Foremost among these proponents is Phaneuf, of Boston

There is a well-founded prejudice against immediate repair of the cervix because of the interference with drainage of the lochia and because the traumatized and edematous tissues do not heal well when immediately sutured, the exception being hemorrhage due to deep unilateral or bilateral tears

Routine postpartum examination for a raw, inflamed, or lacerated cervix should be carried out four to six weeks after delivery, and here the cautery is the ideal method of causing healing and inversion with a minimum of office treatments

Masson and Parsons conclude that cauterization is as effective as amputation in the cure of leucorrhea and that pregnancy occurs more often, labor is more often normal and lacerations less frequent, following thorough cauterization of the cervix than following amputations

Where cervical pathology exists alone, it is usually well to try cauterization first even if operation need be resorted to later

If other operative procedures are indicated, such as curettage, perineorrhaphy or pelvic work, it would, of course, be expedient to complete the work surgically at one sitting

H. Schmitz says co-existing chronic cervicitis must be treated, usually by cauterization

F. L. Payne stresses the fact that the great majority of leucorrhreas are of cervical origin, hence curettage should not be done when cervicitis or endocervicitis alone is present

Cautery is certainly indicated in superficial leucorrhea, simple erosion and uncomplicated cervicitis

Properly performed cauterizations are much safer in subsequent labors than postoperative scar tissue as the cautery destroys only the mucous membranes and endocervical racemose glands that harbor the infection

The problem of dystocia following either amputation or cauterization may not be lightly passed but the increasing success of cervical incisions in labor or the low abdominal cesarean section in cases of cervical dystocia go far toward solving this problem and the importance of curing cervical pathology justifies radical measures

Pemberton and Smith stress the importance of curing chronic cervicitis as a measure in prevention of cervical cancer

In a large series totaling 5962 cases there were 740 amputations, 1408 cauterizations, and 3814 trachelorrhaphies. Only five were known subsequently to have developed cancer and these in the trachelorrhaphy group

In another series of 669 cases of cancer of the cervix, none had had cauterization or amputation and only twelve had had trachelorrhaphies

In view of the growing popularity of cauterization for cervical pathology, perhaps a warning should be given against two distinct dangers

1 In cases showing pathology even slightly resembling malignancy, biopsy must be performed before or at the time of cauterization

2 There is an ever-present danger of stenosis and occlusion of

the cervical canal and no case of deep cauterization should be discharged without gentle dilatation with the Hegar dilators

Again, a warning might be sounded against plastic surgery in the presence of active infection as the author has personally seen several cases of pelvic peritonitis resulting from Sturmdorf operations on infected cervices where the eversion and hyperplasia seemed to indicate surgery

#### CONCLUSIONS

1 The infected cervix is a major factor in focal infections, in the etiology of sterility, as a cause of dystocia, as a cause of post-partum morbidity and as a pre-malignant menace

2 Every gynecological examination should include careful visualization of the cervix.

3 Thermal cauterization and cervical amputation are the two outstanding methods of treatment. Both have their failures and successes and frequently these two treatments should be combined.

4 In cases where malignancy is suspected even remotely, biopsy should be done before either cauterization or amputation

5 During the child-bearing age, cervical canal occlusions should be avoided by gentle dilatation with the Hegar dilators

6. Avoid surgery in the acutely infected cervix

## INTRAVENOUS THERAPY FOR POSTOPERATIVE SHOCK

By H HOWLETT, M D

Fifth Avenue Hospital, New York City

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MANY theories have been advanced to explain shock. One of the most popular of these is the neurogenic theory, which associates the fall of blood-pressure and consequent shock to exhaustion of the vasomotor center. Many experiments have been performed to study shock, especially during the World War. It was found, in experimental shock, that although the arteries were pulseless and the veins not distended, the heart beat with moderate vigor, the large part of the blood disappearing from the circulation, and that the weakness of the heart-beat was due to a reduced inflow from the veins and not from cardiac deficiency. This theory was also further advanced by the fact that wounded soldiers showing shock had a marked diminution of blood volume in the absence of significant hemorrhage.

The inevitable result of diminution of the blood volume is impaired effectiveness of circulation and diminution of oxygen supply to the tissues, thus causing osmotic and physico-chemical changes in the capillaries. Also, in shock there is a general constriction of arterioles to maintain sufficient pressure to supply the heart and brain. Thus the general capillary field is sacrificed for the brain and heart. The oxygenation originates in the capillary area with the osmotic pressure of the tissue cells rising, thus imbibing more fluid and causing the viscosity of the concentrated blood to increase. The kinetic pressure available in the capillary area, already a small fraction of a few millimeters of mercury, is inadequate to maintain the flow, and the heart finds itself with progressively less and less blood. This chain of events leads to further decrease in blood-pressure and continuation of the vicious cycle, with ultimate complete failure of circulation.

Another cause in diminution of blood volume is dehydration; and those patients who lose much fluid, as by vomiting or diarrhea, are more apt to fall in shock. In the presence of dehydration, the loss

of a small amount of blood may assume an importance out of all proportion to the amount of blood lost

In treatment of shock one must follow out (1) application of warmth, (2) relief from pain, (3) mental rest, (4) restoration of deficient circulation, by fluids. It also may be an advantage at times to increase intracellular oxygenation by insulin. This may be done by giving five minims of insulin at the beginning and end of the intravenous medication. Cardiac stimulants, in the absence of organic heart disease, are generally uncalled for. Also, adrenalin is generally uncalled for, as it raises the blood-pressure in the arterioles but does not improve the volume flow. In shock, not only a higher pressure is desired, but also an increase in blood volume flow.

To restore the volume of circulating fluid, fluid is required. It may be administered by mouth, by rectum, or by clysis. However, if by clysis or rectally, the elimination keeps pace with absorption. Thus, intravenously is the only sure method to increase the blood volume. Of the different intravenous solutions, blood has many advantages. It supplies red blood-cells, as well as volume, and also does not escape as readily from the vessels. The best substitutes for blood are sodium chlorid, glucose, and their combinations.

The method used in the giving of large quantities of intravenous solutions is rather simple. The gravity method is the one of choice, and this is carried out by using a gravity bottle holding about 1000 cubic centimeters of fluid. This bottle is connected by tubing to the intravenous needle. One may use a regular intravenous needle or the small-sized transfusion needle. In many of the cases it is wise to cut down on the vein and to tie the needle in place as one would in doing a transfusion. It is also wise to fix the arm on an armboard to prevent the patient from dislodging the needle. If the vein is not cut down on, the needle may be held firmly in place by the use of sterile adhesive applied across the base of the needle. It is also necessary to keep the intravenous solution at 115° or 120°, and this is maintained by placing hot-water bottles about the gravity bottle. Although there are many elaborate methods to keep the solution at a constant temperature, we found by changing the hot-water bottles frequently one could almost maintain the temperature at a constant point.

The rate of flow is about 500 cubic centimeters per twenty min-

utes The amount of infusion given varies from 2000 to 8000 cubic centimeters At St Luke's Hospital, New York, they have given an average of 4,500 cubic centimeters in about thirty cases Of these cases reported (*Annals of Surgery*, March, 1930), they stated all were benefited to some extent, and many appeared to be life-saving conditions

In case of a chill during intravenous infusion, it should be stopped at once, and in case the patient becomes apprehensive, diminish the rate of flow In the cases reported of chills it has been found that glucose was used The infusion should always be given under the direct observation of one of the house staff

The following, a case where intravenous saline was given for postoperative shock following cholecystectomy and choledochotomy for cholelithiasis and choledocholithiasis, is reported because this method apparently saved the patient's life, as the detailed postoperative notes show

Mrs S, aged forty, case No 45307, admitted April 12, 1930, diagnosis cholelithiasis and choledocholithiasis, sub acute pancreatitis Operated on April 12, 1930, cholecystectomy and choledochotomy The patient was returned from the operating room at 1 30 P.M., 1000 cubic centimeters 5 per cent glucose clysis started on return to ward

2 45 P.M. Patient cold and color poor, not absorbing clysis  
3 40 P.M. Clysis discontinued—not absorbed. Condition poor  
4 00 P.M. Patient cold, pulse cannot be counted at wrist, color poor, patient drowsy and cannot be aroused.  
4 45 P.M. Blood pressure 60/0 Intravenous 5 per cent glucose started.  
5 15 P.M. Blood pressure 82/0 Pulse 88, respiration 36 Patient cannot be aroused.  
6 00 P.M. Blood pressure 100/22 Pulse 100, respiration 40 Cannot be aroused  
6 30 P.M. Blood pressure 104/40 Pulse 100, respiration 40 Patient drowsy but can be aroused Color improved.  
7 00 P.M. Blood pressure 104/36 Pulse 100, respiration 40 Can be aroused  
8 00 P.M. Blood pressure 118/40 Pulse 100, respiration 40 Can be aroused  
8 30 P.M. Blood pressure 118/42 Pulse 104, respiration 36 Patient appears brighter Asked for glass water and drank about half of it. Would raise arm when asked. Was conscious of intravenous for first time  
9 00 P.M. Blood pressure 120/46 Pulse 102, respiration 36 Appeared improved.  
9 30 P.M. Blood pressure 120/50 Pulse 100, respiration 34 Appeared improved.  
10 00 P.M. Blood pressure 120/60 Patient responds readily when spoken to

10 15 P.M. Blood pressure 120/62 Patient brighter Visiting with nurse  
General condition good.

10 15 P.M. Intravenous discontinued. 3,675 cubic centimeters given in five and  
one half hours Condition of patient markedly improved.

The following morning the blood pressure was 140/88, and remainder of  
convalescence was uneventful

#### CONCLUSIONS

Whatever the absolute cause of shock may be, the essential fact of shock is deoxygenation of the body tissues. This is caused by the decrease in volume flow. To combat shock, restoration of volume of blood must be the first thought. By the above article it is shown that this can best be done by massive intravenous infusions. Although the giving of clysis may in some cases aid, the elimination keeps pace with absorption and the blood volume is not increased. And although intravenous is by no means a new method, we believe the previous failures are due to the administration of insufficient quantities. In cases of postoperative shock the results obtained by the intravenous infusions in massive quantities are so outstanding that we believe this method of treatment is most important and may be a life-saving factor.

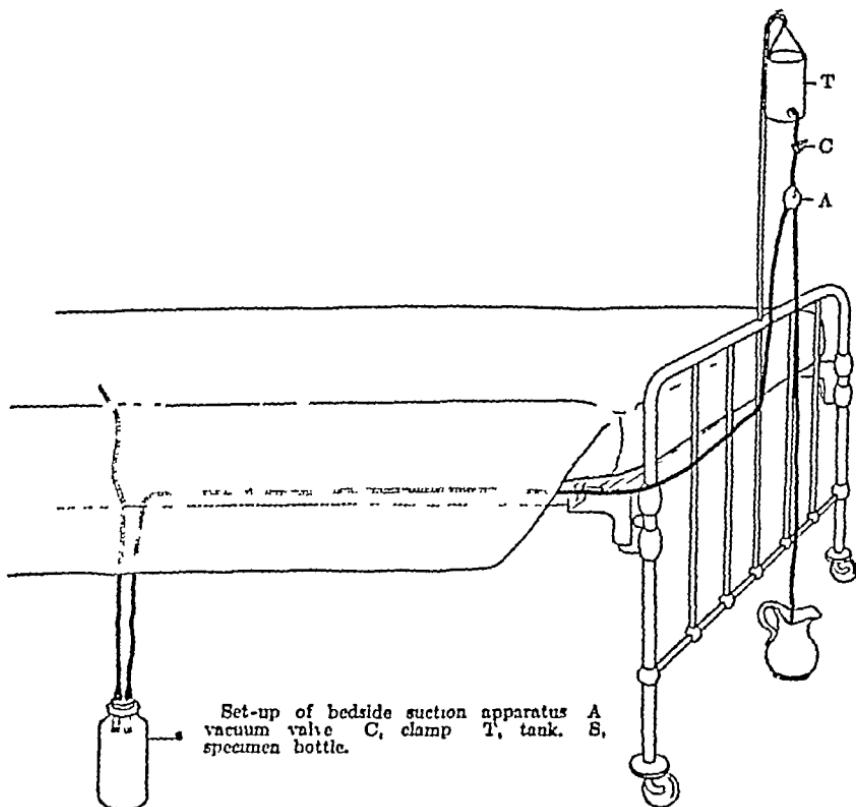
## BEDSIDE SUCTION TECHNIC

By SPRAGUE CARLETON, A M, M D \*

New York City

THE negative pressure valve herewith presented is an outgrowth of the old Darborn suction apparatus. This set-up recommends itself because it can be made from material always at hand in a

Fig. 1



hospital and can be used wherever suction is applicable. It was originally used to take up urine from the suprapubic wound after prostatectomy but since, with the addition of a manometer control suggested by Dr. Donald Gordon, it has been effective in conjunction with the Brewer empyema tube in sucking air from pus-tracts.

\* From the Surgical Service, Fifth Avenue Hospital.

FIG. 5

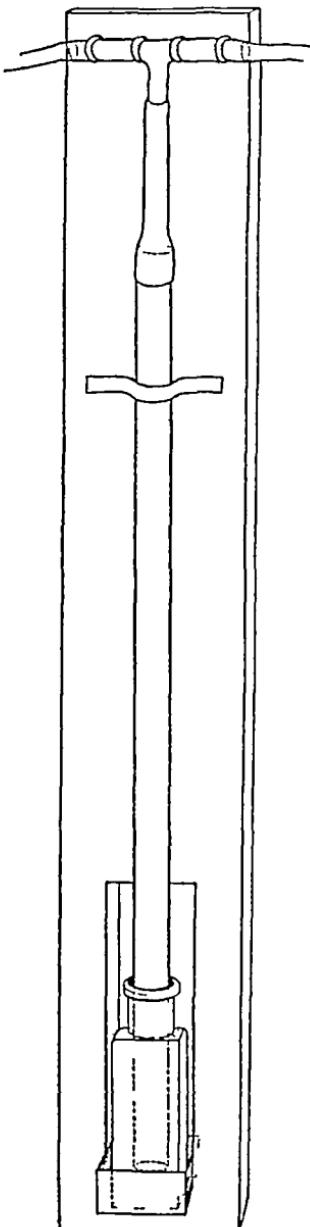


FIG. 2

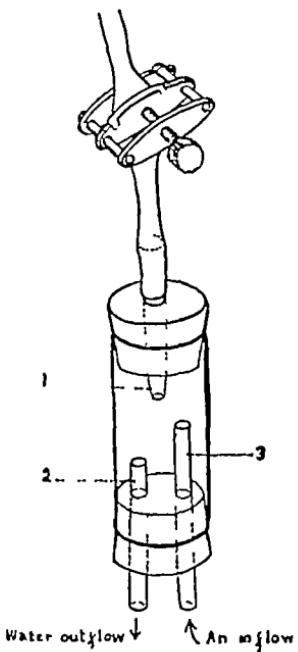


FIG. 6



The set-up (see Fig. 1) consists of an irrigating can suspended about five feet above the floor with the vacuum valve (A) attached to the nozzle by means of a three-inch piece of rubber tubing on

which a clamp (C) is adjusted. The valve (Fig 2) consists of a closed chamber with three openings which can be constructed with a four-inch piece of glass tubing and two rubber corks into which small glass tubing (one-quarter inch) is adjusted as in Fig A. The glass tube marked "2," so set that it is the lowest opening from the chamber, connects with rubber tubing (slightly larger than Dakin tubing) with the pitcher on the floor. Water dropping from the tank "T" into the valve "A" checked by the stop-cock "C" to flow forty drops a minute will, by gravity, start to drop down through tube "2" to the pitcher and in so doing will suck air through tube "3," which, if connected with the specimen bottle "S," will condition a vacuum there, so that a tube from this bottle will tend to accumulate the urine or other discharge from the wound. The specimen bottle should be attached to the bed below the level of the mattress. When the tank is empty the water that has come to the pitcher is used to replenish the tank.

With a big suprapubic drain, as indicated in Fig 3, the suction is utilized by having a small right-angled glass tube that drops loosely into the suprapubic tube, gathering the urine as it rises in the tube.

Where there has been a breaking down of the fascia and a gaping wound, a short right-angled glass tube fixed by means of a rubber band to a tongue depressor with a small hole at its tip can be adjusted to dip into the depression and drain off the urine as it gathers in the wound. A strip of adhesive holds the terminal in place on the abdomen (Fig 4).

When the automatic manometer control is indicated as in empyema drainage the instrument is installed in the air line somewhere between the valve and the specimen bottle. The manometer is constructed (Fig 5) by suspending a one-inch glass tube (length thirty inches) in a four-ounce bottle. A small "T" tube is used to couple the top of the manometer tube to the negative air system. Varying amounts of water in the four-ounce bottle at the bottom of the tube allow of automatic fixing of the degree of negative pressure.

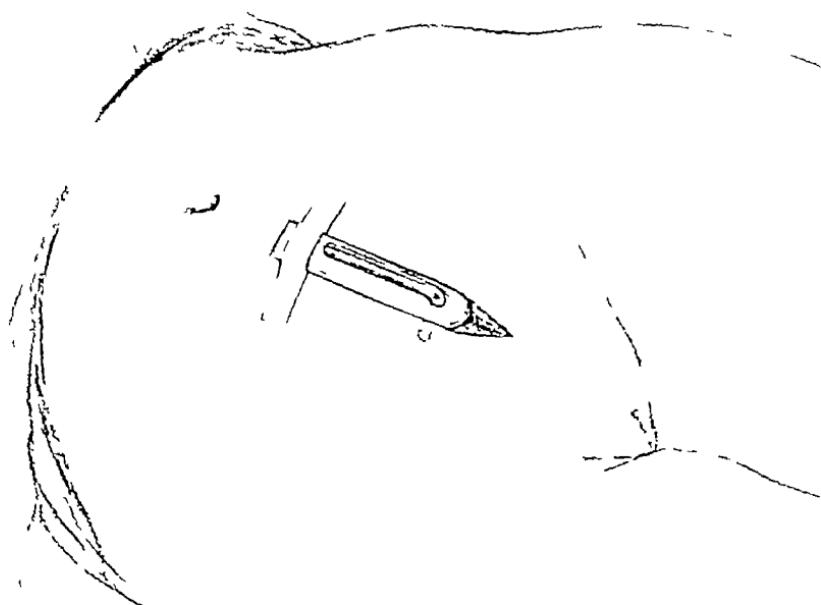
Reid, Yeomans and Cubit, pharmacists of New York City, have available a glass-blown valve, shown in Fig 6, that simplifies the assemblage of this apparatus.

FIG 3



Showing insertion of a big suprapubic drain ready to be attached to the suction apparatus

FIG 4



A right angled glass tube penetrating a tongue depre-sor held in place by an adhesive strip used to drain off the urine as it gathers in the wound by means of the suction apparatus



## MONILIA PNEUMONIA

By C F TENNEY, M D, F A C P

Director of Medicine, Fifth Avenue Hospital, New York City

PULMONARY infections caused by a species of the *Monilia*, which is a microscopic plant belonging to the class of Hyphomycetes or fungi imperfecti, have been reported from time to time in this country since 1915, at which time Boggs and Pincoffs described a case in Baltimore. Cases have been reported from South America, Southern France, Italy, India and the Philippine Islands, as well as from some of the other tropical countries.

We wish to report from the clinical and X-ray findings, a case which was treated at the Fifth Avenue Hospital, as it so closely resembled any one of the types of pneumococcus lobar pneumonia. We have found nothing in literature of this typical lobar type.

This patient, Mrs. M. A. N., aged fifty-two, married, a native of the United States, had lived all of her life in the eastern part with the exception of the period from November, 1927, to November, 1929. This time she spent in Honolulu. During her stay there, she had a hysterectomy for fibroids and her appendix removed.

She was first seen by one of my associates on January 5, 1930, at the hotel at which she was residing. She complained of chilliness, epigastric distress and pain between the scapulae, a general aching and malaise, with temperature 102°, some cough, and not being able to sleep. She stated that she had been ailing for the past two years, in fact, she had never been well since she had the uterus and appendix removed. She quite readily consented to come to the hospital for further study and treatment. She was admitted on January 6, 1930, at which time she presented a picture of a middle-aged woman, rather flushed and nervous. Her past history shows that she had been troubled with weakness, shortness of breath, cough, slight expectoration and, on exertion, pain in the middle of the chest which radiated down the left arm. She had had a great deal of heart-burn, for which she took bicarbonate of soda. She also had pains between the shoulder blades, which she described as excruciat-

ing Patient had been on a soft diet for two years, had never been jaundiced, stools have alternated between constipation and diarrhea and, at times, have been very dark in color She had had sinus trouble and middle ear infection, for which she had received innumerable treatments She had pleurisy as a young woman, but did not remember which side She has had a pain in the chest at varying intervals which several doctors have diagnosed as angina pectoris. Others have derided the idea and state that she had a simple bronchitis, but for the past six months, pain has persisted in the chest radiating toward the left scapula

Family history is of no importance "Her father died at fifty-two, cause unknown", "mother at fifty-six, of some intestinal trouble," perhaps tuberculosis, one maternal aunt had pulmonary tuberculosis Patient had no severe illnesses during childhood and had always remained perfectly well Her husband is living and well She had one child, which died in infancy of meningitis No other illnesses except the present one and the operation in Honolulu

Patient complained that for several days she had chilliness and felt that she was running a temperature in the afternoons and evenings Her physical examination showed that the skin was clear with no icterus or eruptions, the head was normal in shape, the hair was brunette in type, turning to gray, the eyes were somewhat injected but reacted to light and accommodation, there was some reddening of the external auditory canal of the right ear, left ear was normal, she had several carious teeth present, the tongue was reddened and smooth, the pharynx and tonsils were negative, she had no cervical adenopathy, thorax was normal in size and shape Her abdomen was on a level with the ribs, there was a large scar in the lower median line, liver and spleen only slightly palpable, the extremities showed no edema On percussion the left upper lobe was somewhat dull, while the right was normal Her heart was not enlarged

On auscultation, there were a few coarse râles heard over the left base with increased bronchial breathing and increased vocal fremitus over the left upper lobe Heart sounds were clear, distinct with no murmurs or friction rubs Blood-pressure was 120 systolic and 80 diastolic, the breathing was rapid and somewhat shallow and the patient had rather an unproductive cough, temperature was 102°,

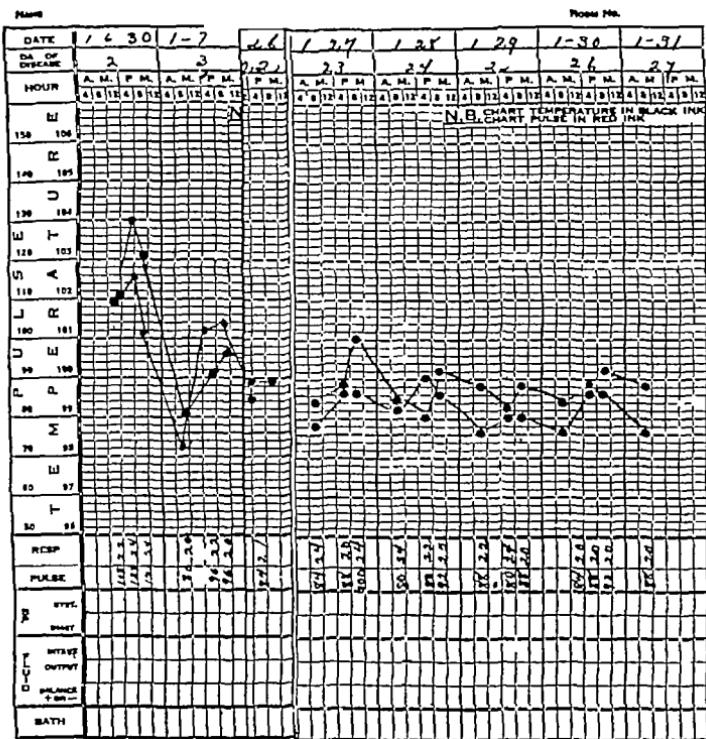


FIG 3



Second picture of mouth

pulse 130 and respirations 34. The reflexes were present and active. The blood-count was hemoglobin, 82 per cent, red blood corpuscles, 4,200,000, white blood corpuscles, 15,300, polymorphonuclears, 89, lymph, 10, eosinophil, 1, the blood-culture was negative, the blood Wassermann was negative in all antigens. Urine was acid in reaction, specific gravity, 1.020, albumin, very faint trace, very occasional finely granular casts. The sputum was scanty, chiefly saliva, it had a sweetish odor and later it was brownish-yellow, thick, glistening and contained a few soft, white, cheesy portions, and was not blood-streaked, it showed no pneumococci in the smear and no fixed type. Some of the sputum was inoculated into the peritoneal cavity of a mouse. The following morning the mouse was alive and well. Very few bacteria were found in the peritoneal cavity and none of them were pneumococci.

#### BACTERIOLOGICAL REPORT

January 10, 1930—Sputum inoculated in evening. Mouse alive and well in morning, about eighteen hours. Very few bacteria found in peritoneal cavity.

January 11—Sputum inoculated 4 P.M. Direct smear showed a few pneumococci. No note regarding presence of yeast cells. Mouse alive and well at 9 A.M. Very scanty amount of fluid in peritoneum, staphlococci predominating. No pneumococci seen (Figs 1 and 2).

January 13—Rather thick, brownish yellow, glistening sputum, containing a few soft, white, cheesy portions. Smears made from these portions show many yeast cells and a long, slightly curved bacillus. These organisms are also found in other portions of the sputum. The soft, cheesy portions closely resemble the membrane seen in the patient's throat this day. Yeast isolated, identified as a *Monilia*, on Sabouraud's medium. The bacillus was not isolated, but resembles *B. vermiculoides*.

January 23—A white rat was inoculated intravenously with 1/10 cubic centimeters of an eighteen hour culture. No reaction.

March 22—Patient returned with small white patches underneath the tongue, which were easily removed without causing bleeding. *Monilia*, culturally the same as that present on January 13, 1930, isolated. (Fig 3).

The graphic chart illustrates the temperature, pulse and respiration throughout the course of the illness.

An X-ray was taken on January 8, 1930 (Fig 4).

Stereoscopic films of the chest in the postero-anterior direction show diminished aeration of the upper half of the left upper lobe with increase in density over this area extending from the level of the second interspace up over the apex. The greatest amount of density is in the mediastinal half, and this appears to merge with

the mediastinal shadow. There is some infiltration into this area, and the infiltration begins at the root and extends upward. I believe that this is a pleuropneumonic type of lesion involving the upper half of the upper lobe and the area described above. On one examination I do not believe that we can determine the etiological factor, and the process at the present time appears more pleural than lung.

There is an extensive root thickening with numerous calcified glands around both roots and a generalized peribronchial thickening throughout both lungs. The greatest part of this change is probably from former respiratory infections.

There is a pleural shelf between the upper and middle lobes of the right lung from some former pleural involvement. We do not believe that there is any free fluid in the pleural cavity. The heart and aorta are normal in size, shape and position.

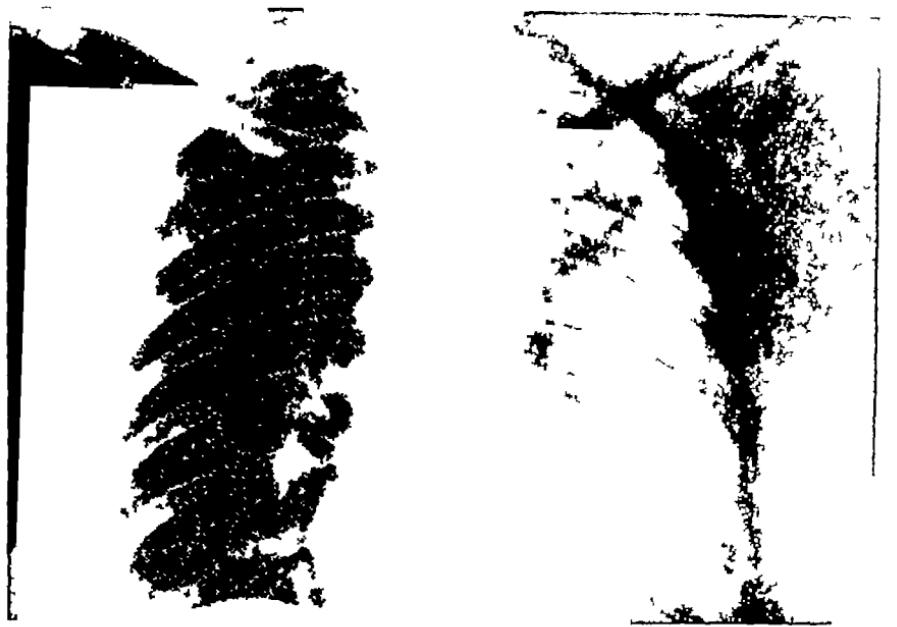
Film of the chest with the portable apparatus taken January 11, 1930, shows a very marked extension of the process in the left chest. At the present time the upper three-fourths of the chest is obscured by a dense shadow which we believe is the result of infiltration and consolidation of the left upper lobe. In view of the recent films, it is apparent that the former films, made January 8, 1930, represented a beginning of a lobar pneumonia. The extent of the infiltration is that area occupied by the upper lobe, and the upper portion of the lower lobe is obscured and may be involved but cannot be identified (Fig. 5).

On the fifth day of the patient's illness she complained of soreness in her mouth, which, on examination of her throat and tongue, we found to be due to several white patches about two centimeters in diameter, which looked like a growth of thrush, which frequently occurs in the mouths of bottle-fed infants. Smears and cultures made from these surfaces showed the *Monilia* to be present, the same as found in the sputum.

Film of the chest with the portable apparatus on January 15, 1930, shows that the pneumonic process involving the left upper lobe is undergoing resolution. (Fig. 6.)

Film of the chest taken January 24, 1930, shows further resolution in the infiltrative lesion in the upper left lobe. There is some

FIG 4



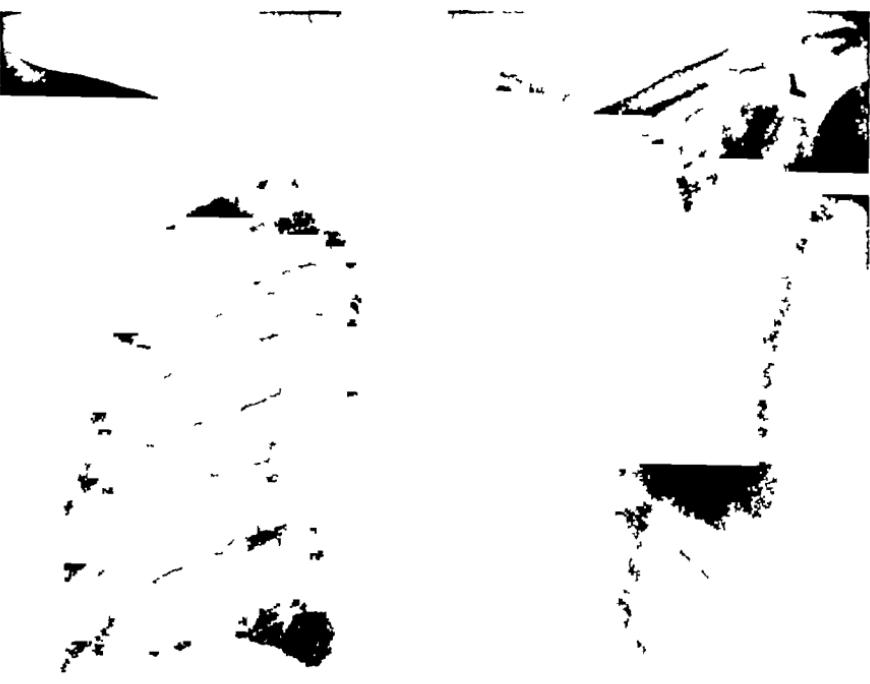
January 8 1930 Shows early pneumonic process over the apex of the left lung extending upward from the root infiltration along the mediastinal border of the root

FIG 5



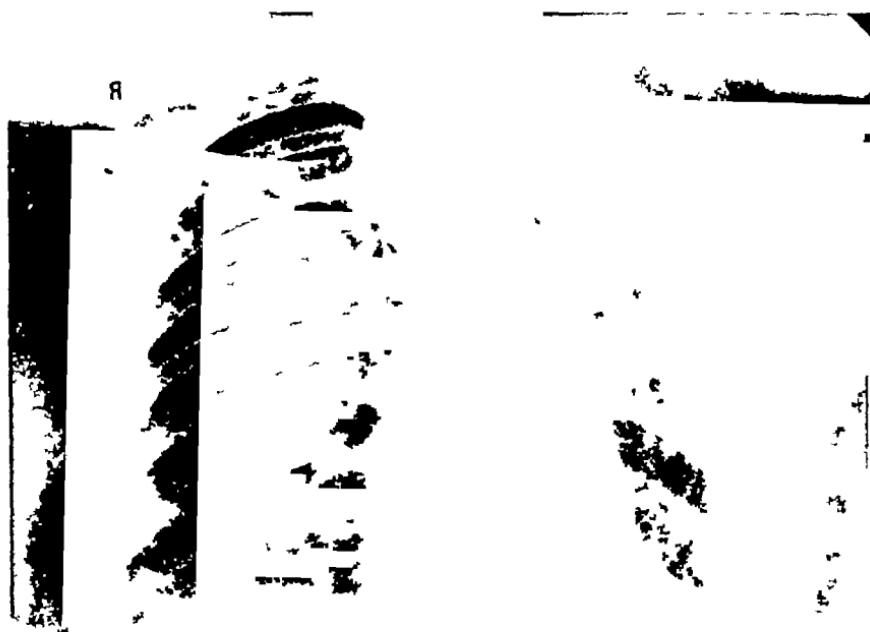
January 11 1930 Extension of the pneumonic process involvement of left upper lobe

FIG. 6



January 15 1930 Beginning resolution in the mediastinal half of the process

FIG. 7



January 24 1930 Further resolution of the process certain amount of infiltration remains in the lung peculiar hilus extending from the root downward to the dome of the diaphragm probably inter-lobe plural process.

FIG 8



March 25 1930 Complete resolution of the onic process in the lung and the process extending the root to the diaphragm normal chest

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)

thickening of the pleura and some lung infiltration remaining from the incomplete resolution of the recent pneumonic process. There is a shadow along the left side of the mediastinum extending from the root down to the region of the diaphragm, and the left diaphragm is higher at this time than originally. I am unable to identify the shadow, and I believe it would be wise to recheck after a short interval (Fig 7)

Patient remained in the hospital from January 6, 1930, to February 2, 1930, at which time she was discharged and went to Atlantic City for convalescence. Her mouth and throat remained free from the patches during her three weeks' stay in Atlantic City. Just prior to leaving Atlantic City, however, she had a coughing attack and raised a large amount of mucus, the next day she noticed that she had another white patch in her mouth, as she was coming back to New York, she did nothing about it until we saw her two days later, at which time she showed two white patches on the under surface of the tongue, smears from these showed a *Monilia* the same as in the original mouth culture which was taken.

After the diagnosis of *Monilia* was made, patient was placed on potassium iodide on 1 5-gram doses daily. The patches in her mouth were painted frequently with a 2 per cent. tincture of iodine, also a mouth wash of saturated solution of sodium perborate was used. Patient began to improve rapidly and in a short time she was discharged, free of symptoms. When she returned to us on March 22, 1930, at the time when the growth appeared again in the mouth, an X-ray film was taken, which is as follows

March 23, 1930

Film of the chest in the postero anterior direction shows that the infiltrative lesion in the left chest which was shown in the films made in January has undergone practically complete resolution. There is only a small amount of thickening along the ascending bronchi to the left upper lobe (Fig 8)

There is some root thickening and peribronchial increase throughout the chest. The pleura shows no exudate

In our opinion, the case was one of *Monilia* lobar pneumonia. The bacteriological findings were negative for pneumococci and streptococci as shown by smear, culture, and inoculation into mice. The *Monilia* was present in abundance in sputum, mouth cultures, and recurrent mouth infection from sputum

The patient has been seen from time to time since the above picture. Her cough has disappeared and her mouth is clean. She has gained ten and one-half pounds in weight. She still complains at times of some pain in her chest, but has improved so much that she has taken an apartment and is doing her own work.

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## TREATMENT OF CARBUNCLES AND CELLULITIS ABOUT THE NECK AND FACE\*

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IT IS not an uncommon thing to see a notice in the paper of the death of an individual four or five days after he had picked a small pimple on the face. It is a very rare thing to find a notice of the death of an individual following the development of a carbuncle.

From a medical standpoint, these two lesions are as diverse as the poles. *The average carbuncle, if left alone, will heal.* They are dangerous only when interfered with unintelligently.

### CARBUNCLES

The medical profession offers only a diminution in the length of disability of an individual suffering from carbuncle, since these lesions are essentially self-limited. They are caused by infection of the hair follicles, or sebaceous glands about the neck. They may start from what is commonly called an ingrowing hair. Usually beginning as the infection of a single follicle, they may spread to other follicles in the immediate vicinity until an area from about two to two and one-half inches in diameter is involved. It is very rare to find one which does not present somewhere on its surface a point which is easily recognized as its center, and this is the point which the general practitioner should watch for most carefully.

In the treatment of these lesions it is never to be forgotten that they have a general as well as a local cause and the patient's general condition must be as carefully treated as the lesion itself. Remembering that rest of the part is an essential in the treatment of all inflammatory processes, wherever possible the patient should be put to bed and instructed to lie on his side or face, so that he will not bring pressure to bear on the carbuncle.

Until the place at which the carbuncle is "pointing" is readily apparent, local applications of saline solution or boric acid solution

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\* From the Surgical Service, Fifth Avenue Hospital

are the best forms of treatment. Pastes, such as antiphlogistin and salicylic acid, are the next most efficacious remedies. Ichthyl ointment, which has been handed down to us by our forefathers in medicine and has its greatest effect on the minds of the physicians prescribing it principally because it is black and smells badly, is of no particular value. Once the "pointing" process is apparent the tactics must be changed.

The following are a few "don'ts":

*Don't* be rough

*Don't* palpate unnecessarily

*Don't* attempt to squeeze out the core

*Don't* apply ichthyl paste as it is of practically no value

*Don't* "nick" it. When you make up your mind to open the lesion, incise it free

*Don't* rub the lesion

*Don't* forget to treat the patient generally as well as locally by forcing fluids, rest in bed, good food, sunshine or ultra-violet rays.

Of these the two most important are "Don't palpate unnecessarily" and "Don't 'nick.' " In the surgical service of a hospital staff we frequently see the results of so-called medical incision, where the patient comes in with a lesion, which, if let alone, would have taken care of itself, is now a widely spread carbuncle in the center of which is an incision so small that adequate drainage has not been accomplished. When you decide that surgical interference with a carbuncle is indicated, incise it freely and maintain drainage by the use of rubber dam strips or sterile elastic bands.

Never use gauze for the drainage of carbuncles unless you are in a position to see to it that the gauze is kept constantly wet. What it is wet with is of minor importance. Neutral acriflavin, iodin solutions, or 70 per cent alcohol are the most efficacious and readily available.

The type of incision to be used in the carbuncle is also of minor importance as long as the incision is free and provides adequate drainage. Personally, I prefer the so-called crucial incision with excision of the center. This permits of free drainage from the area and will also allow granulation to proceed when nature is ready for it.

Once adequate drainage has been established, gentle pressure on the incision from the periphery towards the center, when intelligently performed, in such a manner that it expresses the thick, creamy pus from outlying crypts, is a very helpful procedure. I cannot emphasize too strongly the fact that this procedure must be intelligently exercised. After incision and drainage, the wet dressings should continue until granulation tissue is apparent on the lesion. When the dressing is removed, large blocks of necrotic tissue can be picked out of the center. This procedure usually removes plugs which have been tending to block the peripheral crypts.

Carbuncles of the face present an entirely different problem. They are one of the most dangerous lesions in all medicine because they usually start in what everyone is familiar with as a pimple. This pimple is either squeezed too early, or else has some other infection added to it by being incised with an unsterile instrument.

Never interfere with a carbuncle of the head or face until you absolutely have to. Put the patient to bed, keep hot, wet dressings on the lesion, but keep your instruments in your bag. If you are absolutely convinced that you must interfere surgically, take the patient to a hospital and treat him with all the respect that you would a patient suffering from generalized peritonitis and septicemia, because septicemia is their most imminent danger. The lymphatic drainage of the face, particularly the cheek and lip, is always towards the meninges and the spinal fluid offers very little phagocytic barrier.

Ligation of the superorbital vein is indicated only in those lesions in which expectant treatment fails. As in all local inflammatory processes, the keynote to the patient's progress is the pain which he has. Pain means pressure. Pressure means extension of the inflammatory process. Hence, the increase of pain means the spreading of the lesion. A decrease in the amount of pain means the lessening of pressure and an improvement of the condition. As long as pain is decreasing surgical intervention is not indicated.

Treat the patient generally, transfuse him at the first sign of failure of systemic resistance. Give him plenty of sunshine, or ultra-violet light. Maintain a high visceroprotein diet, but keep your hands off, and everyone's else hands off, the lesion until "pointing" is clearly indicated. When "pointing" has been accomplished,

unlike the treatment of carbuncle of the neck, the treatment of a carbuncle of the face demands that you should simply lift off the thin covering of the "point" and observe it to see that natural drainage be maintained. If the patient is to recover, nature will drain the carbuncle. The only assistance that she needs from you is to aid her in maintaining that drainage.

#### CELLULITIS

Cellulitis differs from carbuncles in that it is a generalized instead of a local inflammatory process. "Pointing" is never observed. The only localization is the formation of a subcutaneous lake of fluid. This can generally be identified by the touch as it is usually softer than the surrounding area. When identified, incision and drainage should be performed to allow for the evacuation of this fluid. This incision and drainage, as in the case of carbuncles, must be free and must be maintained by the use of rubber dam or bands. Before localization is evident, local applications of heat in the form of warm, wet dressings is indicated. I believe that magnesium sulphate should never be used for this purpose because of the fact that unless the dressing is kept constantly moist it tends to become hard as a plaster cast and produces trauma with its ensuing pain. Boric acid, saline solution, even hot water are better.

General treatment of the patient is even more important in this condition than in the treatment of carbuncles. Early transfusion, forcing fluids, high visceroprotein diet and rest of the part are of prime importance. When you feel the localization is complete and can definitely determine the center of the process, incise and drain it freely. After incising, if you wish to use an antiseptic, use 3 per cent iodine, M B G V 5, neutral acriflavin, or S T 37.

A few "don'ts". *Don't* make a medical incision, *Don't* forget that an injection of local anesthetic is almost as painful as the incision itself, and tends to spread infection, so use gas oxygen wherever possible, *Don't* forget that "freezing it" with ethyl chloride is almost as painful as the incision. If you use ethyl chloride, drop it on an inhaler over the patient's nose, *Don't* try to express the fluid, *Don't* use gauze drainage, sterile rubber dam or sterile rubber bands being the best, and *Don't* apply a pressure dressing, but use loose gauze changed frequently.

## A CYST IN THE LEFT VENTRICLE OF THE HEART\*

By WILLARD H SQUIRES, M D

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THE postmortem discovery of a fairly large cyst arising from the endocardial lining of the left ventricle prompted a search of the literature concerning this subject in regard to possible etiology and incidence. Of the few cases reported, all were attributed to the echinococcus and it is very possible that this parasite was the factor in this case. Only three cases of hydatid (echinococcus) cyst of the heart have been reported in North America—one by Grulee,<sup>1</sup> in 1905, Davis, and Balboni's<sup>2</sup> case in 1917 (with a metastatic cyst of the brain), and the third by Mills<sup>3</sup> in 1922.

Hydatid disease is comparatively rare in the United States and of the 241 cases collected by Lyons,<sup>4</sup> 91 per cent were foreign-born. In his series of cases the liver was affected in 73.7 per cent, the lung 10.8 per cent, and the rest of the viscera in very isolated instances. In some of his cases more than one organ was affected, in fact, he states that 287 organs were involved in the 241 cases. In his entire collection he found the heart involved but once and in this case the cyst was in the pericardial sac. The preponderance of the statistics regarding the hydatid cyst is furnished by foreign authors and the combined figures of Davaine, Marguet, Neisser, Madelung, Finsen, Cobbold, Herrera-Vegas and Cranwell<sup>5</sup> dealing with a total of 4,457 cases showed the heart to be affected in only thirty instances.

The literature of echinococcus infection in domestic animals of this country is very scarce and practically all of the work, both experimentally and in a literary way, deals with the animals of the far North, as Iceland or Greenland. Only one case in a dog has been reported by the Bureau of Animal Industry in Washington, D. C. Of the 10,996,039 swine slaughtered under the auspices of this same bureau in 1924, hydatids were found in the liver in 2,045,

\* From the cardiac branch of the Third Medical Division of Bellevue Hospital (Service of Dr. John Wyckoff). A paper read before the pathologic meeting of the Fifth Avenue Hospital on December 5, 1929.

or 1.86 per 10,000. Cattle and sheep were also found to be infected, but less frequently. In spite of the rarity of this disease in these animals, it indicates that there may have occurred cases of echinococcus disease in man in rural districts that have passed unnoticed.

The hydatid cyst, which is the larvate stage of the *Taenia echinococcus*, is one of the smallest parasites of this species, measuring from three to five millimeters in length and two to three millimeters in breadth. It inhabits the intestinal tract of the dog, fox, or wolf, but the dog is the foremost agent in human infection. Briefly, its life cycle follows — the gravid terminal segment of the worm is discharged in the faeces of the dog and the ovum gains access to the intermediate host (sheep, cattle, man, etc.) by means of drinking water or uncooked food. The ovum goes to the stomach, escapes from its protective shell, bores through the gastric or intestinal wall and enters the circulation. After entering the blood-stream, the embryo usually lodges in the liver, which is the primary site in about 74 per cent of the cases. Because of its small size, however, it is capable of traversing the capillaries of the liver and may be carried to the lungs, which are the next in frequency of the organs involved (11 per cent.) On coming to rest, the embryo slowly increases in size and presents a thick outer lamellated cuticle and a thinner parenchymatous layer. An outer connective tissue layer is furnished by the host. Daughter and granddaughter cysts may form, either within the cavity of the mother cyst, or exogenously. A primary cyst of the left side of the heart results from an embryo penetrating both hepatic and pulmonary capillary barriers.

Cardiac cysts are prone to rupture because of their location and sudden death may occur due to showers of infected emboli — such a case having been reported by Businco<sup>6</sup>. Oesterlen<sup>7</sup> also reports a cyst of the left ventricle with emboli in the right femoral arteries. Another serious complication is secondary infection which may be spontaneous and result in abscess formation and, occasionally, pyemia. Most of the cases reported have been in young subjects, usually twenty to thirty years of age, but occasionally the person may live many years, due to death of the embryo with degeneration and calcification of the cyst. Coote<sup>8</sup> reports a dissecting-room case in an elderly subject that had undergone spontaneous cure.

Hydatid cysts of the heart have never been diagnosed before death because they produce very few symptoms unless secondarily infected, and then the picture is one of an acute infection. Cardiac murmurs are of no value. An eosinophilia is present only during the active growth of the embryo and disappears when the organism becomes dormant or dies.

#### REPORT OF THE CASE

E F, aged 68, single, seamstress, Nativity, U.S. Chief complaint, constipation and pain in the lower left quadrant. Onset, seven weeks previously when patient noticed that her habitual constipation had increased. Pain in the abdomen occurred five weeks previously and was sharp and cutting in character, and aggravated by constipation. Except for a recent loss of twelve pounds, her previous and family histories were negative. Physical examination showed patient to be chronically ill. Veins of neck were dilated. Moderate emphysema, heart border slightly enlarged to the left with a short systolic murmur at the apex. Abdomen was slightly tender, but no tumor masses or rigidity were present. There was slight edema of both legs. Blood pressure 118/68. X rays of the gastro intestinal tract revealed an irregularity and partial obstruction of the sigmoid to which the diagnosis of an infiltrative lesion was made. Stomach and small intestine were normal. Wassermann, negative. Moderate albuminuria. Leukocytes were 18,600, 86 per cent. polymorphonuclears, 14 per cent. lymphocytes. No eosinophiles were noted. Patient ran a low grade septic temperature and died just one month after admission.

The postmortem findings are as follows. On opening the chest, the precordial area was normal in size. The left pleural cavity was dry and contained a few adhesions at the apex, which were easily broken. The right pleural cavity was dry and entirely free from adhesions. The thymus gland was absent. On opening the pericardium, about ten cubic centimeters of clear fluid were seen in the dependent portions of the sac, the heart was slightly enlarged, weighing 400 grams. On opening the heart, the right side seemed normal, the pulmonary and tricuspid valves apparently well preserved. On the left side of the heart the auricle and mitral valve appeared normal. However, in the left ventricle, near the apex, was a lobulated, cystic, irregular mass about three by one and one half by one centimeters in size, that had a definite wall. It was fluctuant and contained a creamy, purulent exudate. The cyst extended around and between the chordae tendinae, but did not invade them nor the musculature of the ventricular wall. The aortic valves were somewhat retracted and contained patches of sclerosis. The coronaries were moderately sclerotic and thickened. The myocardium appeared normal on section. Both lungs were readily removed and were small, light in weight, and had a feathery consistency. Cut surfaces showed the presence of air. Bronchi and peribronchial nodes were normal. The spleen was normal in size and on section. The stomach and duodenum were normal. In the small intestine about eighteen inches from the caecum, the gut was looped and the apposing surfaces adherent. At the point of contact there was an area of ulceration involving the serous surfaces of the two sections of the gut forming

the loop. The intestinal walls were not thickened and the lumen was apparently unchanged. The ulceration did not extend into the mucosa. The remainder of the small bowel was well preserved. In the lower sigmoid colon, at the level of the brim of the pelvis, were many strong adhesions which firmly bound the section of the small intestine, above described, to the colon. For a distance of about ten inches the colon was markedly thickened and there were areas of ulceration and necrosis on the serous surface of the bowel. There were also firm adhesions between this mass of adhesions and the posterior left side of the uterus. At the point of contact there was an area of deep discoloration, ulceration, and necrosis. The pancreas was normal. The kidneys were small, capsules adherent, surfaces granular, and the cortex thinned. The adrenals were normal. The uterus and adnexa were normal. The aorta showed moderate sclerosis. The lymph nodes were normal. The organs of the neck were normal. The brain was not examined. The microscopic diagnosis showed a laminated cyst wall with round-cell infiltration. The cyst contents showed many hydropic white cells and sodium chlorid crystals. No hooklets or scolices were seen. The intestines showed large abscessed areas surrounded by round cell infiltration. The lungs showed small patches of bronchopneumonia (terminal). The kidneys showed chronic interstitial nephritis (Figs. 1 and 2).

#### COMMENT

The cyst in the left ventricle of the heart was probably of echinococcal origin because of its laminated structure. The failure to find the hooklets or scolices is not unusual in cysts of long standing because of degeneration. The thick wall and contents of this cyst are indicative of one of long standing and secondary infection. There is a possibility that this cardiac cyst was a factor in producing death in this case, since the large abscess in the intestine could well have been due to a septic embolic phenomenon.

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Showing multilobular form of the cyst



Fig. 1

Showing cavity of the cyst



Fig. 2

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# Cases Presented at the University of California Medical School by Lewellys F. Barker, M.D., of Baltimore

SYNCOPAL ATTACKS WITH A HISTORY OF TACHYCARDIA IN THE ATTACKS (QUESTION OF PAROXYSMAL FLUTTER, FIBRILLATION, OR PAROXYSMAL TACHYCARDIA) IN A PATIENT WHO HAS HAD FEVER WITH LEUCOCYTOSIS AND HAS SHOWN ECTOPIC BEATS AND INTRAVENTRICULAR BLOCK IN ELECTROCARDIOGRAMS \*

This patient, William B, a white man, a barber, aged thirty, was admitted to the hospital on November 15, 1929, with the following history (summarized by Doctor Lum)

*Chief Complaint*—Recurring attacks of unconsciousness, associated with rapid beating and irregularity of the heart.

*Family History*—Negative, except that the patient's mother has had spells of faintness without loss of consciousness.

*Past History*—Patient was not a blue baby. He had whooping cough in infancy, typhoid fever at seven, pneumonia at sixteen, followed by empyema which was opened and drained, and smallpox at seventeen. There is no history of rheumatic fever, though six months before admission he had what he calls "slight rheumatism" in the left elbow and shoulder for a few days.

The patient married at twenty four, his wife is living and well. He has had no children, contraceptives have been used. His habits have been good, except for occasional constipation. He has lost seventeen pounds in the past six weeks.

He has had occasional headaches and dizziness, and some tingling of the fingers during the present illness. The feet and hands have been cold and blue. He has had slight cough, some shortness of breath, and since the present illness began a rapid pulse. He has risen once or twice each night during the past year.

\* Case presented at the Medical Staff Conference of the Department of Medicine, University of California Medical School, December, 1929

to pass urine, there has been some burning and some difficulty in starting the flow

*Present Illness*—In February, 1929 (nine months ago), while at work, the patient felt faint and "everything started to turn black" He became dizzy, sat down, and was unconscious for ten minutes On recovery, he felt weak, but he was all right again in two hours No cause for the attack was known to him

He felt as well as ever again until six weeks ago, when he suffered from an other attack, which was more severe, and he was unconscious again for ten minutes Upon regaining consciousness this time, he noticed that his heart was beating rapidly and irregularly He states he would feel one forcible beat and then two or three faint beats He believes that he was all right again in twenty minutes His wife states that in both attacks his face turned dark in color during the unconsciousness and regained its natural color as consciousness returned.

The patient felt well again on the following day and resumed his work. He had no other symptoms until one month ago when a third attack came on in the same way as the preceding two attacks He was unconscious for ten or twenty minutes and a doctor who saw him said that his heart action was rapid and irregular Three hours after the attack, he ate supper, though one hour after supper he felt nauseated, vomited and fainted. This nausea was accompanied by severe pain in the epigastrum and was followed by pains that he attributed to gas During the succeeding four days, there was recurrent vomiting, and the vomitus contained bile and mucus After the nausea and vomiting stopped, the tachycardia continued. There was fullness in the right upper quadrant of the abdomen, with dull pain and some tenderness The physician who attended him thought that his liver was enlarged and he was sent into a hospital for ten days where the swelling, pain, shortness of breath, and tachycardia subsided. The patient again felt very well at the end of ten days He states, however, that his temperature rose to 102° F during a part of the time of his stay in the hospital

He has felt well since leaving the hospital except that he has been somewhat weak and has had night sweats for a few nights In the hospital, he was given digitalis

*Physical Examination*—Somewhat cyanotic, pupils slightly sluggish, deviation of the nasal septum to the left, scar of rib resection in left axilla Lungs negative

Heart, slightly enlarged to the left, some sinus arrhythmia, occasional ventricular ectopic beat, no definite murmurs audible, no thickening of the arteries Blood pressure, 108 systolic, 75 diastolic, pulse rate 81

Liver, palpable one finger's breadth below costal margin and slightly tender Slight tenderness at McBurney's point Genitalia and extremities, negative Urological examination, negative

*Laboratory Reports*—Blood On October 19, 1929, showed 15,700 white cells with 91 per cent. polymorphonuclears This count was made in the Chico Hospital

Here in the clinic, on November 12, 1929, the red blood count was 4,130,000, the white count 4,850, hemoglobin 90 per cent., differential 56 per cent., polymorphonuclear neutrophils, 39 per cent., small mononuclears

*Urine* Negative, except for a few pus cells

*Wassermann* Negative

*Electrocardiogram, November 12, 1929*—Rate 67, ventricular ectopic beats from multiple foci Notched  $P_1$  and  $P_2$  (unequalled auricles), intraventricular block with flattened  $T_1$ , right axis deviation, definite evidence of myocardial change (Doctor Sampson)

Doctor Sampson was suspicious of a possible mitral stenosis since the electrocardiographic changes were compatible therewith Thus far, the physical signs in the heart have not pointed to valvular lesions

#### COMMENTS UPON CLINICAL DATA ACCUMULATED

*The Syncopal Attacks*—It is clear that this patient has had recurrent syncopal attacks with loss of consciousness lasting from ten to twenty minutes, but with rapid recovery afterward and a return of the feeling of well-being within a few hours, except on one occasion when he had severe nausea and vomiting at frequent intervals for some time after an attack, and had to go to a hospital for treatment

Syncopal attacks may have a variety of origin, fainting spells being nearly always due to anemia of the brain In this patient it was noticed, on two of the occasions, that his pulse was rapid and irregular at the time of the attack Moreover, he still exhibits at times irregularities of the pulse and there are definite evidences of myocardial damage in the electrocardiograms It would seem reasonable to suppose, then, that the syncopal attacks in this patient are of cardiac origin

The four commonest causes of syncopal attacks in association with cardiac disease are

1 The syncopal attacks of Stokes-Adams' disease (in which heart-block occurs)

2 Those that may occur at the sudden onset of an auricular flutter

3 Those that may occur at the onset of a paroxysmal fibrillation

4 Those that are sometimes associated with attacks of paroxysmal tachycardia

Though the patient has shown evidences of an *intraventricular block* in the EK, it does not seem probable that he has had recurrent attacks of the Stokes-Adams type, for he would have had a slow pulse rather than tachycardia. The great frequency of the

pulse observed at the times of the attack points to one of the other three cardiac conditions

In *auricular flutter* (or, better, *atrial flutter*), we have regular rapid movements of the musculature of the auricles (or atria), but without the occurrence of true atrial diastole. The single periods occur with great regularity, varying only a few thousandths of a second in duration. The excitation wave runs continuously in the same direction through the atrium, passing around the superior or the inferior vena cava either in the direction of the hands of a watch or in the opposite direction (*circus movement*). From the main wave, the excitation passes centrifugal-ward to the upper parts of the right and the left atrium. If the frequency of excitation does not exceed 300 to 500 per minute, the activity may be quite regular, but, should the frequency of the stimulus be greater, there may be a sudden diminution in the performance velocity of 50 per cent or more, and then fibrillation of the auricles may occur.

In *auricular* (or, better, *atrial*) *fibrillation*, the atrial stimulation may occur at the rate of from 500 to 700 times per minute, the ventricles can respond to only a portion of these stimuli, and so we get a complete irregularity in the resulting beats of the heart. In some instances, the frequency of the stimulation of the atrium to contraction has been as great as 3,500 per minute! The irregularity of the pulse in fibrillation is in marked contrast with the steady regularity in flutter.

We owe the origin of the idea of *circus movement* of the excitation wave in atrial flutter to Thomas Lewis and his colleagues. Further studies have shown that in auricular fibrillation, also, there is also a tendency of the excitation wave to move in a circle, but the path of the wave is much more irregular than in flutter. It is thought that the plane in which the *circus movement* occurs may vary a good deal, for there is a constant tendency to return to the old path.

Obviously, there must be a marked shortening of the refractory phase of the atrial muscle in these cases and the refractory phase is shorter in fibrillation than it is in flutter. Flutter or fibrillation may develop in patients under very different conditions—they occur in various infections (e.g., in syphilis), in excessive smokers, and in alcoholic patients. Fibrillation is very common in association with mitral stenosis. I think it was James Mackenzie who was

responsible for the pun that "mitral stenosis and auricular fibrillation are bosom companions" Many patients have fibrillation without feeling very uncomfortable

*Paroxysmal tachycardia* is not a very uncommon disease, especially in younger persons It appears to be due to abnormal impulse formation arising in some part of the heart away from the normal pace-maker The onset, as well as the cessation, of the attacks may be very abrupt It is because the tachycardia occurs in such attacks that we apply the term "paroxysmal tachycardia" (wholly different from the continuous tachycardia of Graves' disease, of atrial flutter and of atrial fibrillation) Such paroxysmal tachycardias have been subdivided, according to the place of origin of the abnormal rhythm, into atrial, ventricular, and nodal tachycardia Since this patient exhibits, at first, both ventricular and nodal ectopic beats, it is easily conceivable that, at times, through the development of foci of hyperirritability, a rather prolonged period of abnormal beats may occur and give rise to the "paroxysm" of tachycardia The age of the patient is in favor of paroxysmal tachycardia rather than of fibrillation or of flutter

Paroxysmal tachycardia due to ectopic foci is a far more benign myocardopathy, as a rule, than that of flutter or of fibrillation Many patients have such a paroxysmal tachycardia and live to a good old age One of my patients was over eighty and there is one case in the literature of the occurrence of paroxysmal tachycardia in a patient of ninety-seven!

In my experience, the *atrial form of paroxysmal tachycardia* is the commonest, but the *ventricular form*, characterized by the rapid recurrence of ventricular extrasystoles, and the *nodal form*, characterized by the rapid recurrence of nodal extrasystoles, may also frequently occur

Medical students who are gaining their training today can have but little idea of the difficulty encountered by those of us who helped to unravel the cardiac arrhythmias before the advent of electrocardiographic tracings Immense progress has been made in our clinics through the systematic reading of the electrocardiograms in our cardiac cases Sometimes, one suddenly runs up against a remarkable condition, the nature of which could not have been guessed without the aid of the EK In this connection, if you have

not seen the very remarkable EK recently taken by Doctor Sampson in one of Doctor Kerr's cases, in which there are two entirely independent series of cardiac cycles going on at the same time, I should like you to ask him to show it to you I have never seen such an electrocardiogram before I am wondering whether its duplicate has ever been seen by anyone, and I consider it to be one of the most interesting electrocardiograms in the world. A careful study of it may compel us to a revision of many ideas that we thought were fully established in cardiac physiology

*The Infectious Process*—This patient has suffered from some obscure infection, the nature of which has not yet been cleared up When in the hospital, he had a temperature of 102° F at one time and he has had a polymorphonuclear leucocytosis Last October, the white count was 15,700, and the polymorphonuclear neutrophil count was 91 per cent, this points to a pyogenic infection somewhere in the body

He had empyema after pneumonia when he was sixteen and he has had a little cough recently The physical examination of the chest reveals, however, no infection of the lungs or pleurae Roentgenograms of the chest have been negative

A careful search for various possible foci should be undertaken I recall that he has had a little difficulty in starting the flow of urine, and one should make sure that he has no chronic prostatitis, no cystitis and no pyelitis The urine is said to be free from albumin, though it contains a few pus-cells

Another point worth keeping in mind is the fact that he had typhoid fever when seven years of age As you know, typhoid is prone to be followed by cholecystitis and the development of gallstones, it might be well, therefore, to have a gall-bladder visualization by the method of Graham

Roentgenograms of the paranasal sinuses should also be made, as well as roentgenograms of any dead teeth

If fever should recur, the tonsils should be carefully inspected and a blood-picture should be made at the time the fever exists It is to be hoped that the source of the fever and the leucocytosis may, before long, be determined and radically treated This would seem to be all the more important, since he had a slight arthritis of the left elbow and shoulder a few months ago

The bare possibility that the patient may have a subacute infective endocarditis (*endocarditis lenta*) should lead us to make blood cultures for *Streptococcus viridans* at intervals

It would seem probable that the toxic-infectious process is responsible for the myocardiospathy, which, in turn, has given rise to irritable foci in the cardiac muscle and to intraventricular block.

*The Anemia.*—It would seem probable that the anemia is also dependent upon the obscure infectious process that has existed

*The Undernutrition*—The patient is five feet nine inches in height, and should, therefore, normally weigh about 157 pounds stripped. He now weighs only 119 pounds. In other words, he is nearly forty pounds under calculated ideal weight. It would seem desirable for this patient to gain weight fairly rapidly and it may be that improvement of the state of nutrition will go far toward overcoming any infectious process that is present.

*The Gastro-enteropathy*—This patient had much nausea and vomiting after one of his attacks. He has also had tenderness in the right lower quadrant and in the right upper quadrant. As I have already said, we should make sure whether or not any infection of the gall-bladder exists, and the region of the appendix should be palpated from time to time to make sure that no local inflammation is active there. Since the severer attack of nausea and vomiting followed upon one of these paroxysmal tachycardiac attacks, it is possible that he had a temporary myocardial insufficiency with acute passive congestion of the liver and other abdominal organs. It will be interesting to see whether or not in the subsequent attacks there is a recurrence of the nausea and vomiting.

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**CHRONIC CYANOSIS WITH ERYTHROCYTOSIS (SYMPTOMATIC POLYGLOBULIA), WITH A RED CELL COUNT OF OVER TEN MILLION, AND HEMOGLOBIN PERCENTAGE OF 137, IN A PATIENT WITH CONGENITAL DISEASE OF THE HEART, WHO ALSO SHOWS SIGNS OF TOXIC OSTEO- PERIOSTITIS\***

There are two great groups of conditions in which there is a more or less permanent increase in the red blood corpuscles in the volume unit (1) a group in which the increase of the red corpuscles is symptomatic and accompanies other pathological states—the so-called *erythrocytoses*, and (2) a group in which the red count seems to be due to an independent disease of unknown etiology, associated apparently with a primary hyperplasia of the erythropoietic tissue of the bone marrow (*erythremia*, or *true polycythemia*)

The symptomatic polyglobulias, or erythrocytoses, can be further subdivided into two groups (1) those that accompany chronic dyspneic states, and (2) those that are due to a sojourn at high altitudes

Chronic dyspnea may be due to congenital heart disease, to acquired heart disease, or to respiratory disease, especially to stenosis of the larynx or trachea

It is interesting that, in experimental animals, a polyglobulia can be easily produced by the injection of epinephrin (Lamson) It would seem as though there were a mechanism for the regulation of the red blood corpuscle content of the blood and that this regulatory mechanism is under nervous control, reacting to lack of oxygen as a stimulus, perhaps through the intervention of the chromaffin system with increased production of epinephrin Temporarily, the liver can be called upon to squeeze out red cells into the blood, but, if

\* Case discussed at the Medical Staff Conference of the Medical Department of the University of California Medical School, December, 1920

FIG. 1



Showing the clubbed toes and acrocyanosis of patient M. C. with polycythemia secondary to a congenital heart lesion



the disturbance continue long, there develops a secondary hyperplasia of the erythropoietic tissue of the bone-marrow

The case to be discussed at the Staff Conference today has had chronic cyanosis and a tremendous increase in the number of red cells in the blood. There has been a belief that congenital heart disease exists in the patient, but the question arises, have we to deal here with a symptomatic polyglobulia or erythrocytosis, on the one hand, or, on the other, with a true polycythemia rubra due to a primary hyperplasia of the bone marrow?

#### CLASS HISTORY

The clinical studies have been made by Professor Kerr with the aid of Doctors Anderson, Stephens, Sullivan and Mollath.

The patient, Mary C, aged twenty six, was admitted to the Medical Teaching Service of the University of California Hospital on January 3, 1929, and remained until January eleventh. She was admitted for the second time a few days ago.

Her *chief complaints* were of shortness of breath, and weakness, symptoms that appeared in early December, 1928.

The *family history* throws no light upon the case.

*Past History*—The patient has lived in San Francisco and has worked as a telephone operator. She was operated upon for hernia in May, 1926, after which she lost much weight until she weighed only 69 pounds, though her average weight is 102 and her maximum weight was 110 three years ago. She now weighs 92 pounds.

The patient says that she has been a fairly strong and active person, though always rather nervous and a poor sleeper. Menstruation has been irregular, particularly during her nervous periods.

*Present Illness*—The patient recalls that her family told her that her lips and cheeks were of a red color and of a bluish tinge some two or three years ago and, about the same time, she began to have rather severe parietal and occipital headaches and her ankles became swollen. A blood examination made at the time of her operation in 1926 revealed a very high red count. She was seen by Doctor Falconer at this time who bled her several times on account of the severe headache, and immediately she had relief.

Some six weeks before entering the hospital she began to be short of breath and to have palpitation on exertion. These symptoms increased and for a week or more before admission she had a cough that was non productive.

*Physical Examination*—Marked under nutrition, general cyanosis, together with marked acrocyanosis, and clubbing of the fingers and toes (Fig 1). Thorax, poorly developed, with slight expansion on inspiration. Percussion note seems to be impaired slightly over both apices behind.

The heart was not much enlarged and no heart murmurs were audible. The pulmonic second sound was very loud and snappy. The pulse rate varied between 70 and 80, the radial arteries were not thickened. The blood pressure

was 116 and 120 systolic and 100 diastolic. Neurological examination was negative.

*Laboratory Test—Blood* On admission, red cell count 7,130,000, hemoglobin 118 per cent, white blood count 6,080, differential polymorphonuclear neutrophils 74 per cent, small mononuclears 14 per cent, monocytes 2 per cent, platelets normal.

*Urine*—Negative except for moderate albuminuria and occasional granular casts, and a few bacteria (motile rods).

*Stool*. Negative

*Renal Function Test* Phthalein output 51 per cent. in two hours, Mosenthal test showed a specific gravity varying between 1007 and 1015.

Studies of the blood chemistry showed a non protein nitrogen content of 62.5 mgs per 100 cc. and a uric acid content of 40 mgs per 100 cc.

In the blood there was 0.9 per cent of reticulated cells. The bleeding time was 2½ minutes.

*X-ray Examination*—The left border of the heart and the pulmonary artery are both prominent, but the heart is not grossly enlarged. The markings of the bronchial tree are increased in width and density in both lungs (Doctor Stone).

*Electrocardiogram*—Heart rate 76, some auricular ectopic beats. Marked right axis deviation. Evidence of intraventricular block, suggesting myocardial change (left bundle branch block?) (Doctor Sampson).

*Treatment*—Because of the chronic renal disease, the protein of the diet was diminished. Because of the polyglobulin with headaches, the patient was bled occasionally and was treated with benzol and by X rays over the bones. Phenylhydrazin was tried but had to be stopped because of the nausea it produced. The patient improved and was discharged from the hospital on January eleventh with instructions to report regularly to Doctor Falconer for supervision.

*Subsequent History*—The patient felt very well for three months after leaving the hospital, but then again she became short of breath and had some precordial pain. Recently, she has grown weak and has become unable to work. The shortness of breath has become pronounced, there has been no edema. The patient's hands have turned of a bluish color, at times they look almost black. During the last few days before admission she had a dry, hacking cough and reported that she had lost seven pounds in the past month. There have been frequent occipital headaches. She has a little menstrual flow every two or three days that lasts for a day or two, in other words, she menstruates more or less all the time.

*Physical Examination*—The findings now are the same as before, except that the cyanosis is much more marked and the cardiac irregularity has increased.

The hyperglobulin is much more pronounced, reaching a maximum on November third when the red count was 10,300,000 and the hemoglobin 137 per cent. A few myelocytes have appeared in the blood. The non protein nitrogen content is now 60 mgs per 100 cc.

Roentgenograms of the skeleton show multiple exostoses, one is present on the navicular bone of the left foot, others are present in the region of the greater tuberosity of the left humerus, there are some localized periosteal thickenings of the distal ends of both tibia and fibula in the leg and the process extends upward along the shafts of the tibia.

On this admission, the patient has been kept at rest in bed, has been given digitalis and, because of the precordial pain, has had some nitroglycerin

#### COMMENTS UPON THE CLINICAL FINDINGS

*The Chronic Cyanosis with Polyglobulia*—It is sometimes difficult to distinguish between a primary erythremia (polycythemia rubra vera) and a symptomatic polyglobulia (or erythrocytosis) Sometimes it is possible, as Naegeli emphasizes, to distinguish between the two by the presence of immature forms of red cells in the blood In primary hyperplasia of the bone-marrow these young forms tend to appear in the circulating blood I can see no reason why, however, in a pronounced erythrocytosis with secondary hyperplasia of the bone-marrow, these same immature forms should not appear The presence of myelocytes in the blood in this patient indicates a hyperactivity of the leukopoietic tissue of the bone-marrow We can be sure that the manufacture of both red cells and white cells is being stimulated, in other words, that there is marked hyperplasia of the whole bone-marrow

The decision would seem to rest upon the presence in the patient of a condition that could account for the production of a symptomatic polyglobulia This patient undoubtedly has an abnormal heart She has ectopic beats and the electrocardiogram shows other abnormalities pointing to some myocardopathy The roentgenogram shows also some abnormality of the heart silhouette It would seem possible, therefore, that the polyglobulia in this patient may be secondary to the cardiopathy

*The Nature of the Cardiopathy*—We found nothing in the history of this patient to suggest an acquired disease of the heart It would seem more likely that we are dealing with some congenital disease of that organ

Of the numerous forms of congenital disease of the heart, one of the commonest is *pulmonary stenosis*, which gives rise in most cases to the so-called blue babies (*morbus caeruleus*) In that condition, there is hypertrophy of the right ventricle, and usually a palpable thrill, the pulmonic second sound is feeble or absent, there is dyspnea on exertion, and hippocratic fingers develop

In *pulmonary insufficiency* of congenital origin, the right ventricle increases in size and a chimney-shaped area of dulness develops in the second and third left intercostal spaces close to the ster-

num (owing to dilatation of the pulmonary artery) In these cases there is usually a low aspirative diastolic murmur audible in the pulmonic area and over the right ventricle

In *persistence of the ductus Botalli*, the right ventricle becomes enlarged and the same chimney-shaped area of dulness develops in the first, second and third left intercostal spaces, due to dilatation of the pulmonary conus, roentgenograms show marked dilatation of the second curve on the left, and there is usually a systolic thrill, and, sometimes, a systolic murmur

In *patent interventricular septum*, there is usually a loud, rough, high-pitched systolic murmur, which also obscures the second sounds of the heart It is heard in the third or fourth intercostal space and is propagated transversely, but not upward to the clavicle (distinguishing it from the sound of pulmonary stenosis) The murmur continues through both heart sounds

In *patent foramen ovale*, there may be no abnormal sounds in the heart, especially as long as the pressure relations between the two sides of the heart remain satisfactory But if the pressure become greater in one half than in the other, a murmur may appear

There is one test that ought to be made in this case By van Slyke's method, and by other methods devised for the purpose, it is now possible to tell whether or not arterial blood gains entrance to the venous circulation In one case not dissimilar to this, and characterized by very marked polyglobulia, it was shown that some 38 per cent of the blood passed directly from the arterial side of the heart to the venous side Perhaps this test could be carried out later upon this patient

The changes in the bones in this patient seem to be those of toxic osteoperiostitis (so common in chronic pulmonary and cardiac disease)

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## INTERMITTENT CLAUDICATION AND THREATENED ARTERIOSCLEROTIC GANGRENE\*

The patient to be discussed at the Medical Staff Conference this morning presents a problem that is not infrequently met with by those who have the medical care of elderly people. This man seems to be in grave danger of gangrene of the left foot and the question comes up as to management.

### CASE HISTORY

William H. G, a white man, sixty-seven years of age, was admitted for a few days at the end of last October and has now appeared again for further examination.

His *chief complaint* is of "pain and swelling of the left foot."

The *family history* and the *past history* throw but little light upon the case.

The *present illness* began a year ago when the patient first had pains in the arches of both feet. These pains were relieved somewhat by arch supports. Soon afterwards, however, he was seized by cramplike pains in the lower legs, which could be relieved by rest, but were aggravated by walking. The toes became red, congested and painful. The symptoms had been severe for some five or six months. Since onset, the condition has progressed in the left foot, which is markedly swollen, and certain areas are very tender to slight pressure. The symptoms are worse when the foot is allowed to hang down, or when it is exposed to cold air.

On *physical examination*, the left foot is seen to be swollen and discolored from the ankle down. There is some dilatation of the veins in the swollen area. The swelling is increased when the leg is pendant. The skin over the foot is tense and shiny in spots and there is red and blue mottling. The local temperature is much higher in the left than in the right foot. The toe nails are thickened and ridged. The whole left foot is very sensitive to cold and to pressure. No pulsation could be felt in the left A *dorsalis pedis* nor in the

\* Case presented at the Staff Conference of the University of California Medical School, December, 1929

left popliteal artery. A feeble pulsation can be made out in the left femoral artery.

The patient exhibits a double *arcus senilis*. The heart is not enlarged, the blood pressure is 140 systolic, 70 diastolic. The peripheral arteries are everywhere thickened and tortuous.

*Laboratory tests* are practically negative except that clumps of pus-cells are present in the urine. The patient has a slight polyglobulia (5,500,000 red cells). The non protein nitrogen content of the blood is 38.3 mgs per cent.

*Wassermann test*, negative.

*Roentgenograms* of the legs reveal sclerosis and calcification of the arteries.

#### COMMENTS UPON THE CLINICAL FINDINGS

The history of intermittent claudication, the marked arteriosclerosis, with palpably thickened arteries and with sclerosis and calcification in the arteries of the legs in the roentgenograms, the disappearance of the pulse in the distal arteries of the left lower extremity, together with the local cyanosis and swelling of the left foot, left no doubt as to the danger of arteriosclerotic gangrene.

The patient was first treated by ligation of the left superficial femoral vein at the apex of Scarpa's triangle. In addition he was kept at rest in bed, and dry heat was applied by means of electric light. He received also one grain of thyroid extract, twice a day.

The operative wound healed spontaneously, but there was no change in the local condition of the foot following upon the operation, except that the venous distension became somewhat greater.

When the patient left the hospital at the end of November he was told to apply to his own physician for close supervision and to continue the use of thyroid extract, 1 grain twice a day. He was to avoid any trauma to the foot, even the most trivial.

He now returns with all the conditions somewhat exaggerated. It is only a question of time when amputation of the lower extremity will become necessary. A decision will have to be reached as to the site of election for this amputation.

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ORGANIC MYELOPATHY WITH SYMPTOMS AND SIGNS  
OF LESIONS IN THE LATERAL AND POSTERIOR  
FUNICULI OF THE SPINAL CORD AND WITH  
TWENTY-NINE CELLS IN THE SPINAL  
FLUID IN A MORPHINE ADDICT,  
DISCUSSION OF DIAGNOSIS, POS-  
SIBILITY OF MULTIPLE SCLE-  
ROSIS OR OF EPIDEMIC  
ENCEPHALITIS \*

In patients presenting signs of lesions in the posterior and lateral funiculi of the spinal cord it is not always possible to arrive at a satisfactory diagnosis during the first investigation, even when there is increase of cells in the cerebral spinal fluid. This patient, whose history was presented by Doctor Mollath at the Staff Conference today, illustrates this point very well.

CASE HISTORY

The patient, W. T. V., a single, white man, aged twenty five, was admitted to the University of California Hospital on November 25, 1929, complaining of weakness in the legs of three or four weeks' duration, and of chronic constipation of four years' duration.

Two years ago the patient became a morphine addict, and eight months ago he entered a sanitarium voluntarily for treatment and was discharged about six weeks ago on probation. Since that time he has left morphine alone and has taken no other drug in place of it.

Since he acquired the morphine habit, he has been very constipated and, during the past four months, the constipation has been very obstinate, not being relieved by cathartics. With the help of an enema he can have a movement about once in three days. He feels distended and has suffered much from gas.

Six weeks ago, shortly after his discharge from the sanitarium, he sprained his ankle, and at that time he noticed that he was somewhat unsteady upon his feet. This unsteadiness has grown progressively worse. It has been accompanied by weakness of the legs, especially in the thigh muscles. If he attempts to run, he falls. Occasionally, his gait is reeling. There has also been some numbness in both lower extremities, and he has felt occasional twitching of the muscles when lying in bed. There has been some blurring of the vision.

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\* Case presented at the Medical Staff Conference, University of California Hospital, December, 1929.

of both eyes. He has had no abdominal pain and no lightning pains suggestive of tabes. Though he has felt nervous, he has slept very well. Recently, there has been difficulty in starting the urinary stream in the morning.

He applied to a clinic for treatment and was given provocative doses of mercury, receiving six inunctions, but the Wassermann reaction was negative before the rubs as well as afterward. As a result of the energetic mercurial treatment, he developed a mercurial stomatitis, with soreness and swelling of the mouth and a rash over his shins. The patient asserts that he has never had syphilis, though he did have gonorrhea at twenty-one.

On physical examination, he was found to be sweating profusely. There was slight enlargement of the lymph glands in the cervical region, in the axillæ and in the groin. His color was good. The pupils reacted normally and the eyegrounds were negative.

The mucous membrane of the mouth was much swollen and was coated with a grayish membrane. The tongue was also swollen and coated, but it could be protruded in the middle line. The throat was red, the tonsils had been cleanly removed. Heart and lungs were negative on examination, as was the abdomen.

Small white scars from hypodermic injections were numerous over the right arm (the patient is left handed). One superficial vein in the right arm was thrombosed, following upon a morphine injection.

The pulse rate was 64, the blood pressure, 118 systolic, 60 diastolic. The deep reflexes were all increased, and the Babinski reaction was positive on both sides. The abdominal reflexes could not be elicited. There was ankle clonus and patellar clonus. The gait was unsteady. Romberg was slightly positive. Cerebral nerves were negative, except that the gag reflex could not be elicited.

On sensory examination of the trunk and extremities, there was slightly diminished sensation for all modalities in the right upper quadrant in the abdomen and areas of hypesthesia in the lower extremities, especially over the calves.

*Laboratory Examinations*—Blood Red blood corpuscles, 4,580,000, hemoglobin 85 per cent, white blood corpuscles 16,800, polymorphonuclear neutrophils 87 per cent, eosinophils 2 per cent, small mononuclears 0 per cent, immature forms 2 per cent. Wassermann negative.

Smear from the exudate in the mouth showed many spirochetes and occasional fusiform bacilli, as well as some streptococci.

Cerebro spinal fluid contained 20 cells. The Wassermann reaction was negative in all dilutions. Globulin was 2 plus, and the colloidal gold curve was 00112221100.

The urine was entirely negative, except for an occasional pus-cell.

#### COMMENTS UPON THE CLINICAL DATA ACCUMULATED

*The Stomatitis*—The inflammation of the mucous membranes of the mouth was evidently due to the mercurial inunctions (mercurial stomatitis). In addition, the patient had a slight infection with the organisms of Vincent's angina.

*The Morphine Addiction.*—The patient does not give us a very clear idea of the origin of his morphine addiction, but the fact that he went of his own accord to a sanitarium for treatment speaks well for his mentality, as does the fact that he has left morphine entirely alone since he left the sanitarium. Most morphine addicts are of neuropathic constitution. It is interesting that the patient was an only child and that the maternal grandmother had had recurring insanity and had been treated in an insane asylum.

*The Obstinate Constipation.*—Though this patient has suffered from constipation for the past four years, it has, during the recent week, been exceedingly obstinate despite the fact that he no longer uses morphine. This extraordinary obstinacy is probably related to the disease of the spinal cord. You will recall that the patient has also some difficulty in starting the flow of urine in the morning.

*The Myelopathy*—Doctor Lennon, the hospital neurologist, has been greatly interested in the nature of the disease of the spinal cord in this patient. The hyperreflexia, the bilateral Babinski, the ankle clonus and the patellar clonus point to lesions of the lateral funiculi of the cord (involvement of both pyramidal tracts), as does the loss of abdominal reflexes. The subjective numbness in the left thigh and in the abdomen, together with the objective disturbances of sensibility, point to involvement of the dorsal funiculi of the cord and perhaps also of the sensory paths in the lateral funiculi. We have, then, to deal with lesions of both the dorsal and the lateral funiculi of the cord, as well as with meningeal irritation (revealed by a cell count of 22 in the spinal fluid).

As to the nature of the malady, syphilis seems to have been ruled out, both by the serological tests and the therapeutic test. The pathological process has been slowly progressive, unlike the development of an ordinary myelitis. Primary lateral sclerosis is rare at this age and, moreover, is not accompanied by sensory symptoms or by pleocytosis.

Combined sclerosis, such as that met with in pernicious anemia, is not accompanied by pleocytosis and it is rare in one so young. The blood shows no signs of pernicious anemia, but the stomach contents should be examined to rule out an achylia gastrica.

Multiple sclerosis is a possibility, considering the patient's age and the development of the spinal lesions.

Epidemic encephalitis should also be kept in mind on account of the number of cells in the cerebrospinal fluid, but if the disease is epidemic encephalitis, the localization is atypical since there are so few symptoms pointing to the brain. We have no record of the determination of the sugar content of the cerebrospinal fluid. I think that the determination of the sugar in the cerebrospinal fluid should be made a part of the routine examination of such fluid, since hyperglycorrachia is strongly in favor of encephalitis and against multiple sclerosis. Normal cerebrospinal fluid may have a sugar content varying between 0.3 and 0.6, but a content above 0.7 is strongly in favor of an encephalitic infection.

The further course of this patient will be watched with deep interest. If there has been an encephalitic infection, other signs will doubtless appear sooner or later. If no signs develop within the nearer period, a chronic myastatic condition with the development of a Parkinson-like syndrome may show itself in the course of a few months or a year or two. On the other hand, if we are dealing with multiple sclerosis, cerebral symptoms should sooner or later develop, particularly temporal pallor of the optic discs. The number of cells present in the spinal fluid is rather against the diagnosis of multiple sclerosis but does not exclude it.

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#### ALLEGED ATTEMPT AT SUICIDE BY A WOMAN OF SEVENTY-ONE WHO STATED THAT SHE HAD GROWN DESPERATE REGARDING HER ECONOMIC SITUATION, DISCUSSION OF THE MENTAL STATE\*

This patient, lying here in bed and looking thoroughly cheerful, was admitted to the hospital yesterday after an alleged attempt at suicide.

\* Case presented at Ward Rounds in the Medical Teaching Service of the University of California Medical School, December 14, 1929

Dr Evelyn Anderson has made a résumé of her history, which I should like to give you in some detail on account of its interest from the psychiatric standpoint.

The patient, Del A., a widow, by occupation a dressmaker, aged seventy-one, was brought into the hospital on Friday, December 13, 1929. At 8 o'clock on that morning she had been found by a group of students upon the steps of the Pharmacy Building nearby. An empty bottle labeled "Laudanum" was found in her coat pocket, as well as a letter, addressed to the University of California, stating that the bearer wished to leave her body to the University for scientific purposes, and for that reason she had chosen to end her life upon the hospital grounds.

Upon examination after admission the patient showed no evidence of poisoning by opium. She was quite alert mentally and seemed to take a real interest in the commotion she had created. She sipped the hot coffee that was brought to her, evidently enjoying it, and she made protest against attempts at restoration.

When asked why she had tried to end her life, she said that she had no money for food and clothing, that her clothes were so shabby that she was ashamed of them, that she was unable to get work, and that the Associated Charities had refused to help her.

Asked to describe the happenings of the preceding twelve hours, she gave the following account. Her daughter, who lives in another part of this city, had been at the patient's house for dinner and had asked her mother to make over a dress for her. (On making this statement the patient sniffed and expressed her regret that she had been unable to do this last thing for her daughter.) After dinner she went to a whist party, hoping to win a money prize that would be sufficient to help her for a day or two until she found work. She did not win, however, and returned to her apartment at ten o'clock. After tidying up the room, she sat down and wrote a farewell note to her daughter, as well as the letter to the University of California that was found in her pocket. She then got out a bottle of laudanum, which she said she had kept for at least twenty years, and left her apartment. On reaching the hospital grounds about midnight, she drank the laudanum, of which she said "there were only three good mouthfuls," and then curled up on the steps of the Pharmacy Building and tried to go to sleep. Passing automobiles and street cars were, however, so noisy that they kept her awake. (It is rather surprising that she could have remained upon the steps of the Pharmacy Building through the night and not have been noticed by the night watchman.)

On going over the hospital records, it was found that the patient had applied at the out patient department in November, 1929, complaining of pain in her eyes, itching of the eyelids and difficulty in reading fine print. The family history was negative. She was born in Kentucky seventy-one years ago, has lived "all over the United States," and has earned her living by doing house work and dressmaking. Her husband is dead, but she has two daughters living. She has had twelve miscarriages, some of them spontaneous, the others induced.

She passed through the menopause at the age of fifty two. Four years ago, hysterectomy was done because of a large tumor. During the past four

years she has suffered several minor injuries. She stated that she has always been nervous. Recently, she has had transient attacks of dizziness and has become short of breath on slight exertion.

Upon physical examination in the out patient department, the findings were largely negative. The patient seemed to be remarkably well preserved for her age. There was some generalized arteriosclerosis, chronic conjunctivitis and chronic eczema.

Notes of her case were made in the social service department of the dispensary on November fourth by Miss Mellye Anderson, who suggested to the patient that she go to the Associated Charities for help.

On December third passes were supplied to the patient to be paid for by the Women's Out Patient Department Auxiliary Donation (price \$2.25).

*Present State*—As you look at the patient as she lies here in bed you see no picture of depression, at any rate, at first glance, she looks contented, alert, and thoroughly happy. Asked if she is blue and gloomy she says, "No, I'm not that sort." Asked why she attempted to commit suicide, she says that she had no money and could not get work.

On asking her why she did not apply to the Associated Charities she said "You try it, they won't help you." Then she added that she was told to go to them and went down to see them but found that their office would not be open for some hours, so she decided not to wait.

Asked if she did not think it illogical to attempt suicide when she might easily have secured help, she says that she could not get help and that the future looked black to her, and, as you see, she now does look sad and weeps.

Asked if other people have been good to her, she says "yes," and that "no body has been against her." She does not seem to harbor hypochondriacal, melancholic or paranoid ideas.

On testing her ability in calculation and her speech, these seem to be normal for her age. She is entirely oriented as to time, place and persons.

You will note that her responses are not slow like those of a depressed patient, there is no psychomotor retardation here. On the contrary, the patient is very quick in responding, her thoughts seem to come quickly, and her associations are rapid. Perhaps she is a little distractable. I should say that there was a little psychomotor acceleration rather than any retardation.

Now as to *diagnosis*—The patient may be of manic depressive constitution, though she gives no history of nervous breakdown, of depression, or of periods of excitement. Still, she gives me the impression this morning of emotional imbalance, of rather quick alternation between states of euphoria and states of depression. It may be that these oscillations are not outside the normal oscillations of a patient of syntone temperament.

The ethical nature of the patient does not seem to be over-developed. The history of induced abortions and the history of fabrication that I understand has been obtained are pertinent in this connection.

I am not wholly sure that this patient expected to die from the taking of the laudanum. Of course, the amount she took was quite insufficient to cause death, though she asserts that she fully expected to die and that she hoped to die. Her mode of attempting suicide had something theatrical about it. She had written a letter to her daughter and she had written to the authorities of the University willing her body to the Medical School for scientific purposes.

To make this convenient for them she took the laudanum upon the steps of the Pharmacy Building and she lay down there to die. All this is in her own report of the affair. May it not be possible that we have to deal here with behavior that was intended to excite interest in her person and sympathy for her condition, rather than with a genuine attempt at suicide? That possibility should be considered, for such behavior is not uncommon in persons of hysterical makeup.

*Subsequent History*—Several examinations of the patient in the hospital showed no alterations on the physical side other than those found in the outpatient department. The arteriosclerosis was not of high grade and did not seem enough to account for cerebral changes that would lead to alteration of behavior. The case was referred to Miss Rose Steinhart, the Chief of the Admitting Unit, for further investigation from the social side. Miss Steinhart asked the Associated Charities whether the patient had come to them or not. They reported that they had told her that they would investigate her home condition and that she should return the next day, but, instead of returning, she left town.

The patient had told Mrs. Anderson in the Admission Unit of the University of California Clinic that she had no relatives, but as soon as she was brought to the hospital she spoke about her daughter to whom she wrote the night before that she would commit suicide. When in the hospital she refused to have her daughter notified that she was all right. Miss Steinhart made all arrangements for her care before she left the hospital. She was to return to her apartment and the Associated Charities had promised to pay her rent and to supply groceries until such time as other arrangements could be made. She was taken to her home by a volunteer worker and her landlady was asked to look out for her for the present and seemed most anxious to co-operate. While she was in the hospital the patient's expenses were paid by our State Fund.

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# Diagnosis and Treatment

## FACTITIAL PROCTITIS

### A JUSTIFIABLE LESION OBSERVED IN PATIENTS FOLLOWING IRRADIATION\*

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AND

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THE term factitial proctitis is used to designate pathologic phenomena sometimes found in the walls of the rectum following the extrarectal application of radium or a combination of radium and Roentgen-ray in the treatment of lesions involving pelvic structures other than the rectum (Frontispiece)

The purpose of this study is primarily intended (1) to describe the changes in tissue observed and thus distinguish the process from active carcinomatous involvement, and (2) to outline a therapeutic regimen designed to arrest the process as well as to heal the lesion, adding greatly to the comfort of the patient. It is our belief that the etiologic factors involved are not simple, instead they are decidedly complex and seem to occur as the result of a combination of constituents. In the main such components are omitted from this report except for only brief mention.

Factitial proctitis is characterized by pathologic changes in one or more walls of the rectum, usually the anterior wall, and in the region of the second valve. The severity of the change varies from mild inflammation in the rectal mucosa to complete dissolution of an area in the wall between the rectum and the vagina. The latter condition rarely develops except when patients succumb to the carcinomatous process and when the tissues about the rectum and vagina are extensively involved by malignant extension (Table 1). The explanation seems many times to lie in the fact that the carci-

\* Read before the American Proctologic Society, Buffalo, New York, June 22 to 24, 1930.

noma has replaced the normal tissues separating the rectum and vagina and the rectovaginal fistula develops as a result of the disintegration of the carcinomatous substance under the influence of irradiation. If irradiation will destroy or inhibit the carcinoma, the rather remote possibility of proctitis occurring should not and does not interdict its use.

Articles on various conditions of the pelvic tissues, including the rectum, following the use of irradiation have appeared <sup>2 5 6 7 8 9 10</sup>, <sup>11 12 13 14 15 18 19</sup>. However, direct visualization, by means of the proctoscope, of a factitious lesion on the anterior wall of the rectum,

TABLE 1  
*Rectovaginal fistula after irradiation outside the rectum*

Radium treatment, milligram-hours	Roentgen ray treatments	Proctoscopic appearance	Interval between proctoscopic diagnosis and appearance of fistula, months	Interval between last irradiation and appearance of fistula months
8300	21	Factitious ulceration	24	36
8426	6	Factitious ulceration	19	20
4200	4	Factitious proctitis	13	34
?	12	Factitious proctitis	7	17

opposite the cervix of the uterus, in cases in which treatment by irradiation has been carried out, has not been reported, so far as we can ascertain.

Radium has been used in The Mayo Clinic, in the treatment of disease, since 1915. However, the records of work previous to 1921 are not entirely satisfactory for statistical purposes, and therefore we have studied especially the cases of patients who have registered since January 1, 1921. In the clinic, during the later period of nine years, more than 33,000 patients were examined with the proctoscope. A group of 2,073 patients with pelvic lesions, usually carcinoma of the cervix or fundus of the uterus, had been treated by irradiation either at the clinic or elsewhere. It was found that during the nine-year period sixty-five patients had complained of rectal symptoms following the treatment of the extrarectal lesions. The list includes all patients who presented these complaints and in whom some pathologic process was found during proctoscopic

ination. Most of the patients had been treated early in the nine-year period. There has been an incidence, therefore, of 3.13 per cent. of factitial proctitis in this group of 2,073 patients. Among the 33,000 patients who were examined for all rectal disorders, the incidence was 0.196 per cent. Forty-eight patients had been treated for carcinoma of the cervix of the uterus, eight had had irradiation applied to the fundus of the uterus for carcinoma or fibromyoma, six had carcinoma of the ovary, and one each had been treated for actinomycosis of the right inguinal region, epithelioma of the bladder, and "ulcers of the womb," elsewhere (Table 2).

TABLE 2

*Original lesion for which irradiation was applied in sixty-five cases of factitial proctitis and sigmoiditis*

Lesion	Radium only		Radium and roentgen ray		Total	
	Cases	Per cent	Cases	Per cent	Cases	Per cent
Carcinoma of cervix	9	13.8	39	60.0	48	73.8
Carcinoma of ovary			6	9.3	6	9.3
Fibromyoma of uterus	5	7.8			5	7.8
Carcinoma of fundus of uterus			3	4.6	3	4.6
Epithelioma of bladder	1	1.5			1	1.5
Ulcers of uterus	1	1.5			1	1.5
Actinomycosis of right inguinal region	1	1.5			1	1.5
Total	17	26.1	48	73.9	65	100.0

cosis of the right inguinal region, epithelioma of the bladder, and "ulcers of the womb," elsewhere (Table 2).

Forty-eight of the sixty-five patients received treatment by radium in the clinic and seventeen had been treated elsewhere. In brief, the treatment at the clinic consisted of fifty milligrams of radium for each application and from one to twelve treatments were given. The time of each course of treatment varied from one week to a month, if more than one treatment was given. The usual procedure was to give two or three vaginal applications and four or five interstitial, intracervical or intra-uterine applications. The amount varied within wide limits. The smallest of the doses which produced rectal irritation was 800 milligram-hours given within the uterus of a patient with fibromyomas. The largest amount given

was 15,100 milligram-hours, the average dosage was 5,856 milligram-hours

Seventeen patients were treated with radium only and forty-eight were treated both with radium and Roentgen-ray

All of the patients were adult women, the youngest was aged thirty-one years, and the oldest was sixty-two. The average age was 47.5 years.

We were able to make a more accurate study of the forty-eight patients who were treated at the clinic, and from this group we learned that the average interval between the last application and the appearance of rectal symptoms was 4.75 months. The shortest time which elapsed before the onset of rectal trouble was one week, and the longest time was six years. The majority of these patients (65.4 per cent) were free from symptoms for more than three months after the last treatment, 14.2 per cent did not note symptoms until a year or more after the last treatment, and 20.4 per cent began to have difficulty before three months had elapsed. The average interval between the last treatment and the appearance of pathologic changes seen through the proctoscope was 11.6 months. The shortest period before the appearance of changes observable on proctoscopic examination was three weeks.

Usually, at some time varying from a few weeks to a year after the last treatment for some extrarectal disorder, the patient noticed a little blood coming from the rectum. At the onset of the disorder subjective symptoms were not a usual accompaniment, other than those which the patient had noticed accompanying the primary complaint. The bleeding was not characteristic. In some cases it was in drops of red blood, in others, there were quantities of blood. Some patients passed a few small clots, others passed 'alarming' masses of old blood-clots. The blood was mixed with, or separate from, the stool, or, in some cases, a formed stool was streaked with red blood.

The nature of the primary disorder made the patients very observant, and they watched all of their daily habits carefully. They had learned to be on the lookout for vaginal discharges and usually they noticed rectal bleeding with its first appearance. The bleeding at the onset usually was without accompanying discomfort. Soon thereafter, however, the patients began to complain. They were

obliged to go to the toilet more frequently and expelled only a small amount of blood. Sometimes, after extreme urgency, they had a profuse hemorrhage. In severe cases, tenesmus and actual pain in the rectum were associated with urgency and frequency. Other patients, with rectovaginal fistulas, complained of passing gas or feces through the vagina or through the bladder.

The symptoms usually were most marked from two to three weeks after the appearance of bleeding, we have observed that the lesion found on proctoscopic examination is large and most acutely active at that time. An exception to this rule should be mentioned. In those cases in which irradiation was given once, or, in some instances, repeatedly, after the onset of rectal bleeding, the rectal symptoms grew worse as time went on. If the irradiation was discontinued, however, the rectal symptoms usually were worse shortly after the onset of bleeding and had a tendency to improve, provided the uterine carcinoma was not beyond the control of such treatment. This is a significant fact, and one which should be borne in mind. In this series, rectal bleeding was the presenting complaint in fifty-nine cases (93.8 per cent.) and it was established on proctoscopic examination that in the remaining six cases there was bleeding within the rectum without the patients being aware of it. They came to the clinic because of troublesome frequency of defecation. They were old and were not very intelligent, and their histories were not entirely reliable. In eighteen cases (27.7 per cent.) rectal bleeding was the only symptom.

Rectal pain was the most common subjective symptom and was complained of by forty-five (69.2 per cent.) of the patients. The site of the pain was variable, and patients had difficulty in describing it accurately. This is not an unusual feature, however. If a lesion is situated in the anus, or about the pectinate line, patients can locate their discomfort easily because of the character and intensity of the discomfort, which is due to the nerve supply in that region. But if the lesion is above the pectinate line, within the rectum or outside of it, the nerve supply is all sympathetic and it is practically impossible for a patient to localize such discomfort accurately.

The patients complained of dull, heavy, aching distress rather than any acute discomfort. A sensation of heavy pressure or a dull pain high in the rectum is the rule. Such discomfort is not usually

modified by bowel movement, posture, or physical activity. A few patients complained of acute pain (high) on defecation.

Twenty-eight (43.1 per cent) of the patients complained of constant and urgent desire to go to the toilet. A sense of pressure, and even of obstruction, was prevalent in this group, and most of them complained of an unsatisfactory and uncomfortable sensation, as if the evacuation had been incomplete. In only twelve cases was actual ulceration disclosed by proctoscopic examination. True diarrhea was not present in any case. Patients with tenesmus complained of frequency of stools (three to ten visits to the toilet each day). Twenty-two (33.8 per cent) of the patients complained of constipation.

The diagnosis can be made most satisfactorily by proctoscopic examination. As a result of involvement of the cervix or of the fundus of the uterus or of some other pelvic structure, and following irradiation, induration and deformity develop in the adjacent tissues, which it is not easy to diagnose by palpation alone. If there is a large ulcer in the anterior wall of the rectum, it may be felt as an indurated crater, but there are many times when some irregular induration in the structures adjacent to the rectum will impart the same "feel" as an ulcer, even when the wall of the bowel itself is intact. Therefore it is necessary to view the rectum by means of the proctoscope, and there is one characteristic which is constant and betrays the true nature of the condition. Regardless of whether there is a definite ulcer, or only simple proctitis, there is always telangiectasis, and the appearance of blood, which first directs the patient's attention to her trouble, is due to this. The inflammation and ulceration constantly have a tendency to heal, and if the carcinoma does not terminate the patient's life, the factitious lesion usually will heal. Even when the patient first is seen, telangiectasis, which is a reparative process in the rectal mucosa, is always noted. The little new blood-vessels, situated superficially in the rectal mucosa, are broken by the slightest trauma, and bleeding occurs as a result of rupture of these capillaries.

In cases of all degrees of proctitis, with or without ulceration, the rectal wall is reddened and studded with numerous small and tortuous new blood-vessels, in the region of the second valve of Houston. Usually merely swabbing this area lightly with a cotton

applicator is sufficient to produce diffuse oozing of blood, which cannot be cleared away enough to view with accuracy the actual degree of involvement. We have found it necessary at times to defer examination on this account. As time goes on a break may occur in the mucous membrane, and ulceration may develop. This is not usually the case. As a rule, the condition improves from the first (except in fatal cases), and gradually the reddened and inflamed area loses its acuteness, and is replaced by a paler than normal, healed mucosa, with a yellowish tinge, and everywhere the ever-present telangiectasis. Even when complete healing has occurred,

TABLE 3  
*Cases in which a lesion was situated more than 10 cm. above the anus*

	Cases
About 12 cm	3
About 15 cm	1
About 18 cm	1
Diffuse from about 12 to 18 cm	1
Diffuse from about 14 to 16 cm	1
Diffuse from lower rectum to 12 cm	1
Diffuse from lower rectum to 14 cm	1
Total	9

this feature is still present. Of course, the little vessels are not as easily traumatized as during the acute period of the disorder, but they still break and bleed a little. It is doubtful if this difficulty is ever overcome entirely.

In sixty-one cases (93.8 per cent) of those in which factitial proctitis was found, the process was limited to the anterior wall of the rectum. In one case, the lesion was entirely on the right wall of the rectum, in three cases the lesions were found on the right anterior wall, and in one case they were found laterally and posteriorly. The lesion was in the lowest ten centimeters of the rectum in fifty-nine cases (90.8 per cent). Table 3 shows the situation of the lesion in those seven cases in which deformity was found higher than ten centimeters above the dentate margin.

If an actual ulcer is present, it also is typical, and its situation is fairly constant (Frontispiece, Fig. 1). The ulcer is oval, or irregu-

larly round, and usually involves all coats of the wall of the rectum. The diseased area has limited mobility due to adherence to structures adjacent to it, and the ulcer usually varies from one to three centimeters in diameter. The largest ulcers we have seen measured three by four centimeters. The base is depressed below the margin of the ulcer, which is smooth and regular in outline. It is covered with a silver-gray or yellowish membrane which is rough, slightly piled up, and very tenacious and tough. These conditions are present when the rectum is being kept clean. If it is not kept clean, the base of the ulcer will be covered with an ugly, slimy, dirty, gray slough which can be removed easily, after which the true base of the ulcer described is revealed.

Telangiectasis is always present in the mucosa surrounding the ulcer, and with it, varying grades of proctitis extending out for a distance of three to six centimeters from the margin of the ulcer. More than one ulcer was seen in only three cases, so that the single ulcer is another of the common accompaniments of the disorder. In only twenty-eight cases (43 per cent) had actual ulceration occurred, in twenty-five of these (90 per cent) the ulcers were single, in two cases there were two typical ulcers in each, and in one case there were multiple ulcers.

It should be kept in mind that the outcome of this condition depends entirely on the outcome of the primary disorder, which is usually carcinoma. In cases in which the activity of the malignant lesion is controlled or overcome by irradiation, the factitial lesion is a self-limiting complication which will heal ultimately with treatment and possibly without treatment (Frontispiece, Fig 2). The course of such a process is prolonged, and usually a year or more will elapse before healing occurs, but if the carcinoma is cured, the factitial lesion will heal also.

Therefore, it requires little in the way of treatment to control the condition. It has been our practice to keep such patients under our care for a period of a week or ten days. During this time we teach them how to care for themselves. Each day, following defecation a warm (100° F.) cleansing enema is given. The purpose of this is to keep the rectum empty and as clean as possible. If more than one stool a day is passed, the patient is instructed to take a cleansing

enema following each movement. By using injections following defecation, the habit of constipation is not encouraged.

The patient is then shown how to inject two ounces of extract of hamamelis following each irrigation, and this is retained until the next movement of the bowel. In those cases in which tenesmus and frequency are troublesome, two ounces of warm olive oil and three drams of suspension of bismuth are injected each evening before the patient retires. This is to be retained, if possible, all night.

Actual or chemical cauterants should never be used, and it is not necessary or advisable to use surgical measures. If the rectum is kept relatively clean, progress will be more satisfactory than by more active treatment. Therefore, during the period the patient is kept under our care, she is taught what is being done for her. She is given to understand that a great deal of time will elapse before healing occurs. She is told also that there will probably always be a little bleeding at intervals.

The outcome is usually satisfactory as far as the factitious changes are concerned, except in those cases in which the malignant process has been so extensive that the partition between the rectum and the vagina has been destroyed and a rectovaginal fistula has resulted.

In our series of cases there were nineteen deaths. Twenty-six patients have recovered, and the factitious ulcer or proctitis has subsided. The condition of the remaining twenty patients is much improved over that endured before their routine of care was instituted, the ulcers are healing. Complete healing has not occurred in any instance in less than fourteen months, and two years usually has been the time required. Bleeding becomes less as time goes on, but practically never subsides entirely. Because of the existence of the small, vulnerable, telangiectatic blood-vessels, it is necessary for these patients to carry on some system of rectal hygiene during the remainder of their lives. For this purpose, warm, unmedicated enemas each day following defecation, and mild laxatives for those who are constipated, will suffice.

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## SYMPOSIUM ON EPILEPSY\*

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### DISCUSSION BY

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## PART I CONSIDERATIONS SURROUNDING THE CONVULSIVE STATE

DR. TEMPLE FAY

THE great advance in our knowledge along physiological, experimental, clinical and roentgenographic lines during the past few years warrants a review of the factors surrounding the convulsive state, and a reconsideration of the older concepts in the light of these more recent observations. The symposium will be devoted to a survey of the problem as it presents itself to us today.

Let us point out clearly that were it not for the splendid co-operation which we have received from many sources during the past five years, the work to be presented would have been impossible. Under the inspirational guidance of Dr. William G. Spiller, many difficult points in the problem have been overcome. The financial and technical assistance given by the D. J. McCarthy Foundation has made possible the pursuit of collateral lines of investigation. The close association of Doctor Winkelman to the problem, and his excellent neuropathological studies, which have disclosed to us the significance of the encephalographic determinations so clearly shown by Doctor Pendergrass's method, evolved especially for this study, has made possible the correlation and results which we offer for your consideration (Figs 1 and 2).

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\* Presented before the Philadelphia County Medical Society, April 9, 1930

Fig. 1



Lateral encephalogram (W.B.) showing characteristic early changes found in the major convulsive state. Note the small nodular convolutions over the frontoparietal areas, especially at the frontal pole and at the vertex. The fluid pathways are enlarged and more air than normal has reached these spaces.

Fig. 2

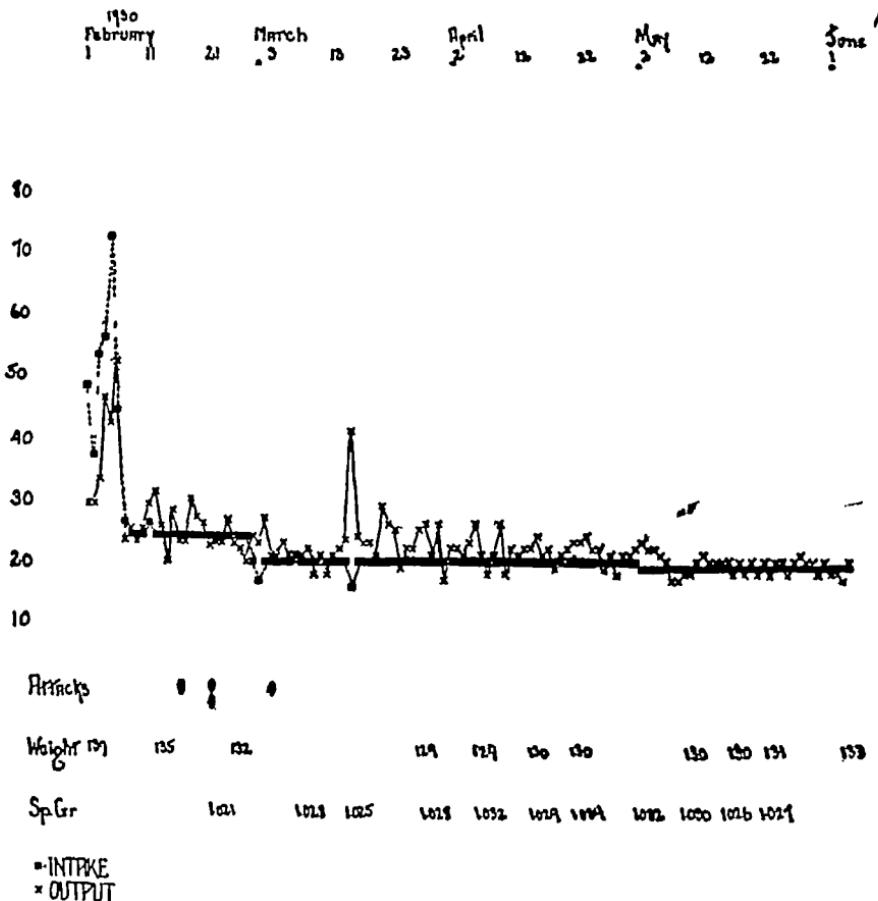


Anterior-posterior encephalogram (W.B.) showing definite increase in the supracortical air shadows about the midline and at the vertex. Beginning cortical atrophy

In dealing with the problem of epilepsy, or the convulsive state, it is necessary to abandon (temporarily at least) the older prejudices and concepts until the more recently obtained facts are fitted into their proper places, and then perhaps a resynthesis will indicate

FIG. 3

Mr. W. B.



(W B) Intake and output record covering four months. Note the frequency of grand mal (black ovals) attacks during the first month and as a definite balance of fluids is obtained an attack free state with the appearance of one petit mal attack (arrow). Patient balanced on twenty ounces at the end of the third month (See encephalograms Figures 1 and 2)

evidence strengthening some theories and forcing the discard of others

During the past five or six years, men who have given extensive thought to this problem have pointed out that epilepsy is a symptom complex, not a disease S A K Wilson, a former pupil of Gowers,

Foster Kennedy, an outstanding neurologist and clinician, and Lennox and Cobb, whose physiological contributions have advanced our knowledge extensively, have shown that convulsive seizures, no matter what their present classifications, belong in a single group or state—the convulsive seizure of isolated or acute incidence has for its mechanism the same factors as those surrounding the more chronic forms which have received, clinically, the name of epilepsy.

The point of view taken that epilepsy is not a disease, but a symptox complex, is very enlightening as regards the futile search for pathognomonic evidence of the condition. A characteristic pathology has not been disclosed. Physiochemistry has shown no constant criteria of this disturbance. The realization by the neurologist that clinical examinations before or after the seizure show practically no signs of involvement of the central nervous system, all argue against the presence of a "disease."

The view of Hughlings Jackson that a diseased motor cell could not produce increased activity (convulsive responses) and the stand that Gowers took stating that the seizure represented the release of intrinsic neural qualities, and that the convulsive phenomena resided within the motor levels involved, not requiring explanation on pathological or extrinsic vasomotor disturbances, are reconfirmed by the more recent work.

At the present time we are inclined to view the convulsion as a normal mass reaction of the motor level involved, to an appropriate stimulus, when inhibitory release is obtained. Thus it seems to be similar to the tendon reflex excepting in its higher complexity. It is a property and response possessed to some degree by all normal as well as afflicted individuals, and when proper conditions become established, a mass response of the higher, more integrated motor levels becomes possible, with the same certainty that a tendon reflex may be obtained by proper stimuli applied to a proper point. The difficulty in easily obtaining the more complicated motor responses lies in reaching the central nervous system so as to properly release inhibitory control, to permit these higher centers to explode.

During the past three years, it has been possible to induce or control the major convulsive seizure in the human being, by regulation of water balance of the tissues and indirectly cerebrospinal fluid

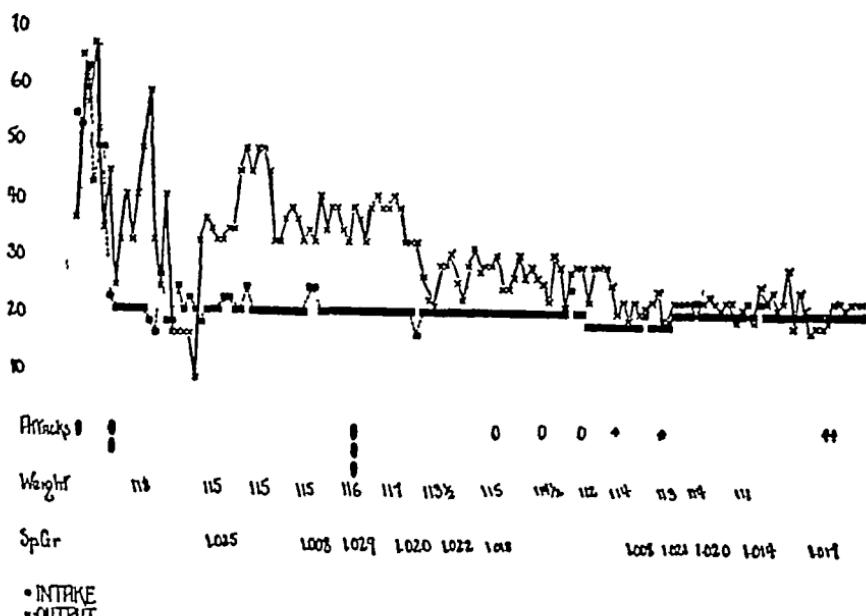
pressure, thus much light has been thrown upon this interesting event known as a convulsion

If we are to assume that a convulsive seizure in its acute or chronic form is the manifestation of a symptom complex, and the

FIG. 4

Mrs. M. N.

1930  
JAN 25 FEBRUARY 4 MARCH 14 24 6 16 26 APRIL 5 15 25 MAY 5 15 25 JUNE 4



(Case M N) Intake and output record on a chronic epileptic. Major attacks for the past fifteen years averaging two to five per week. Note intake and output variation during the period of observation with three major (black ovals) attacks. Fluid intake limited to twenty ounces with output above intake (dotted indiscretions). Return of attacks at the menstrual period with an approach to a balance at the end of the third month. Very light major (open ovals) attacks taking the place of the severe form. Petit mal (arrows) then appeared for the first time in fifteen years as the fluid balance was established. Note weight relation to attacks and fluid balance.

convulsion *per se* is a *normal* mass reaction of released, highly integrated motor levels, we must search for a common denominator running throughout the convulsive state as a whole, which will apply to the acute and chronic types alike, and also be possible of application to the normal individual who has never experienced an attack.

but who may be made to respond in a similar fashion. It is possible to show that such a factor does exist, and there is much experimental and clinical evidence to support this view.

After an extensive survey of the literature, there appears in the comments of many observers a curious association of cerebral hydration states with convulsive episodes. Many isolated phenomena find direct application to the subject, when considered in the light of their effect upon water metabolism. A brief grouping of these references will suffice as the considerations have been discussed in detail in other papers.

#### GROSS OBSERVATIONS

Hippocrates (400 B.C.) recorded the observation that the brains of epileptics were "unusually moist." Alexander (1911) found increased amounts of supracortical fluid, as had Gowers and others. Drainage of this fluid improved the patients in some instances. Dandy, Mixter and others have called attention to these increased fluid accumulations within the arachnoid spaces over the fronto-parietal areas of the brain.

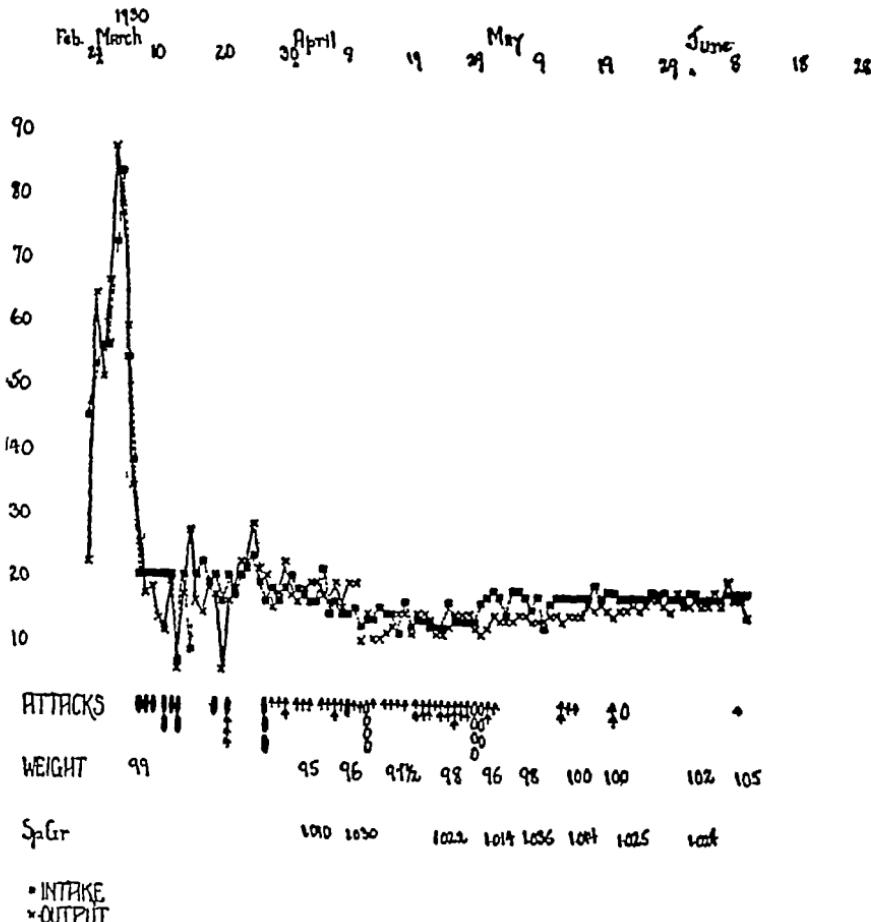
The encephalogram, as Doctor Pendergrass will show, clearly demonstrates these increased fluid accumulations in the epileptic which become quite characteristic in appearance and location, and constitute, we believe, an important factor in the predisposing of the individual to an attack.

We have taken the stand that this increased fluid within the subarachnoid spaces, over the surface of the brain, confined within an almost "closed box," the skull, acts as a hydraulic "cast" on the walls of the cortical pathways for cerebrospinal fluid circulation, and gradually produces, in this area, pressure atrophy of the brain, which Doctor Winkelman will discuss in detail. We believe the atrophy to be caused by this active and demonstrable form of evenly distributed pressure, and have much neuropathological evidence to favor this view. Dandy has ascribed the increase of fluid to a "space compensation" in which an unexplained atrophy of the brain has developed, and the shrunken areas become replaced passively by fluid collections. This argument has two fundamental weaknesses in that it fails to offer an explanation for the atrophy, and, secondly, it cannot be applied to the production of internal hydrocephalus.

associated with great brain atrophy, the recognized cause for which is the pressure produced by obstruction to the outlets for fluid from the ventricles. One could hardly conceive of some unexplained

Fig. 5

MISS H G



(Case H G) Intake and output record showing relationship of attacks to fluid balance. Note the large number of grand mal (black ovals) attacks during the first month of fluid adjustment. Petit mal (arrows) promptly replacing the grand mal as the balance is obtained around 20 ounces per day. Slight grand mal (open ovals) attacks mixed with the petit mal during the second month on dehydration. Marked improvement with only one petit mal attack during the fourth month.

shrinkage occurring in the brain of the internal hydrocephalic, so as to allow symmetrical dilation of the ventricles, and argue that the fluid accumulation simply passively filled these spaces. We are too familiar with the high pressure of the fluid in the ventricles, the

recognized obstruction to the outlets and the analogous examples of other collections of fluid under pressure, in their atrophying effects (hydronephrosis, ovarian cysts, dilation of the cervix in the first stage of labor, etc.), to assume that fluid merely fills these cavities after the atrophy has mysteriously occurred

The cortical atrophy noted in the epileptic and mental defective is characteristically confined to the frontoparietal surfaces of the brain, and, as Doctor Winkelman has shown, occurs when obstruction to the cortical outlets for cerebrospinal fluid (subarachnoid villi and Pachionian bodies) is present, due to imperfect development, trauma, hemorrhage, meningitis and degenerative changes involving these important structures (see Weed)

This supracortical increase, noted two centuries ago, has found definite confirmation by the encephalogram, as well as by direct operative observation. The cause of this increase of fluid and the effects it produces have been demonstrated by Doctor Winkelman and myself. The presence of an obstruction to proper cerebrospinal fluid elimination is closely linked with the question of rate of production of this fluid, as even with an impaired eliminating mechanism, periods of compensation may occur and these may be followed by occasions when the amount of cerebrospinal fluid produced is far beyond the capacity of the filters to eliminate it, thus over-accumulation rapidly ensues, with a slight rise in intracranial pressure. It is evident that water metabolism and the factors surrounding the ingestion, mobility and elimination of fluid throughout the entire body are involved. A few of the physiological factors concerned must be considered at this point.

To Weed and his co-workers, McKibben and Hughson, as well as to Kubie, Howe, Freemont-Smith and Rowntree, we owe the credit for establishing the factors surrounding cerebrospinal fluid circulation, production and elimination, and the effects of fluids introduced into the body on the cerebrospinal fluid system.

The substance of a great deal of work has established that *hypotonic* fluids given either by mouth, vein or peritoneum, promptly produced an increased production of cerebrospinal fluid, and where large quantities of tap water or distilled water were given to animals by the above routes, convulsions and stupor ensued. On the other hand, if *hypertonic* solutions (sodium chloride, sodium sulphate,

magnesium sulphate, glucose) were given, cerebrospinal fluid pressure and volume fell, and increased elimination and absorption of cerebrospinal fluid occurred, convulsive seizures were controlled or prevented

The work of Elsberg and Pike, Drabkin and Shilkret, and Kubie showed in substance that convulsions occurred when hydrated cerebral states (increased cerebrospinal fluid and intracranial pressure) existed, and disappeared when hydrated conditions (drainage of cerebrospinal fluid or reduction in intracranial pressure) were maintained. Thus convulsions occurred spontaneously or could be produced with ease when the experimental animal was hydrated, but, under dehydration, these seizures did not occur or were difficult to produce except by large doses of a convulsant drug.

To Gamble and his co-workers, Ross and Tisdall, goes the credit for establishing the factors surrounding tissue fluid metabolism and the measurement of body water loss under various metabolic conditions. In substance we may say (without attempting to do justice to this important work) that Gamble has shown that fluid storage in the "interstitial" spaces is dependent upon fixed base sodium (Na) and that with the loss of fixed base there is a rapid loss of water from this compartment of the body. His observations showed the epileptic stored fluid between attacks, and released this fluid immediately following an attack. Further, he showed that on carbohydrate metabolism the body cells require approximately two-thirds more fluid for this process than they do when on a protein metabolism. He clearly shows the tendency to store fluids when carbohydrates are plentiful in the diet, and fluid release when absent.

These findings are of tremendous importance when taken from the standpoint of the dehydrating effect of ketogenic (low carbohydrate, high protein, fat) diet (acidosis and reduction in fixed base). The need for strict control of fluid, alkali, carbohydrates, and maintenance of a proper acid base relationship now assume great importance in this whole subject.

Directly interrelated with the problem of carbohydrate metabolism, with its water-storage tendency, comes the question of insulin, epinephrin and pituitrin, and thus we begin to envelop the many glandular groups within the convulsive state under a common denominator, such as fluid and water metabolism. The secondary effects

of these variables surrounding water storage of the tissues, upon an already damaged or disturbed cerebrospinal fluid circulation, acting upon the very motor areas of the brain exposed to its influence, now becomes understandable when transposed into terms of hydraulics within a "closed" space. We are better able to comprehend the incidence of convulsive seizures in the hydrated states, such as eclampsia and uremia, with their renal insufficiency and the consequent water storage and edema, the hydrated states of infants and children on soft or liquid diets, where sudden acute infections shut down the skin elimination, and, by toxic or vasoconstrictor influences, curtail renal elimination favoring fluid storage and cerebral edema.

Anatomical (Swift) and mechanical obstructions to jugular venous drainage of the cortex are factors which favor cerebral hydration, and the hypertensive group with high diastolic and venous pressure or cardiac decompensation fall into possible cerebral drainage deficiencies and are characterized occasionally by convulsive seizures. The "glandular" groups with fat dystrophies and hydration states are commonly found associated with convulsive manifestations.

On the other hand, the striking absence or great infrequency of convulsive seizures in wasting diseases associated with dehydration, such as diabetes, carcinoma, tuberculosis and malignancies, not complicated by cerebral metastasis, is suggestive of the effect of dehydration produced under such conditions.

The evidence indicating the predisposing part that hydration plays in the symptom complex of the convulsion is further substantiated by the careful physiological investigations of Lennox and Cobb. In substance they found the factors which favored increased intracranial pressure and edema predisposed toward an attack. Anoxemia (Landis) favors increased tissue permeability and rapid transudation of fluid from the blood plasma into the tissues (oedema), alkalosis favors edema, thus rapid loss of CO<sub>2</sub> (hyperventilation, see Rosett) favors the production of attacks, while increased CO<sub>2</sub> (rebreathing) tends to acidosis, better utilization of oxygen (lower dissociation curve) and decreases permeability, reversing fluid direction back into the vessels, and tends to prevent or modify the seizure.

The above outline, taken from a few of the many investigators who have contributed to this field, will suffice to illustrate the striking

fact, that either directly or indirectly, the common denominator of fluid and water metabolism enters the problem from every angle, and only in this one factor alone have we been able to find a comprehensive unity in the many contributing factors that surround the convulsive state as a whole, giving rise heretofore to so many seemingly widely divergent and unrelated findings.

In presenting the *predisposing* influence that fluid seems to assume in this problem we are prepared to deal with this phase of the cycle of events by appropriate means of fluid limitation and balance to effect a therapeutic test of this theory. The results of three years of observation on the control of this factor alone has justified the belief that it plays a most significant part throughout the entire convulsive state.

*Precipitating* factors and the associated vasomotor disturbances surrounding a seizure, have been discussed elsewhere.

With this general survey of the problem, with especial reference to the part that fluid may play, we wish to present the objective evidence obtained by the roentgenogram and the microscope.

## PART II. ENCEPHALOGRAPHIC STUDIES

DR. EUGENE P. PENDERGRASS

Encephalography is a procedure in which a series of properly exposed roentgenograms are made of the head in several positions, in the erect posture and after withdrawal of all the available cerebrospinal fluid and replacement with air. This procedure was introduced by Dandy in 1919. Subsequently, Bingle, Martin and Uhler, and many other investigators reported a large series of cases in which this procedure was of value in the diagnosis, character, and localization of brain lesions (Figs 1 and 2).

The indications for the procedure include all of those cases in which the symptoms are obscure, and the neurological examination is essentially negative. That would include head injuries, birth traumas, posttraumatic trauma from any cause, epilepsy, hemiplegia, thrombosis and inflammatory conditions.

The procedure is contra-indicated in any case in which the spinal fluid pressure is twenty mm of mercury or over. This would include posterior fossa lesions or any lesions that would obstruct

the ventricular system, thereby raising the intracranial pressure. It is therefore necessary that a careful neurological examination be made before this procedure is attempted.

Now, if I may have the slides. We wish to consider brain atrophy first. Brain atrophy is divided into three types, depending upon its encephalographic appearances. (1) brain atrophy associated with external hydrocephalus, (2) brain atrophy associated with internal hydrocephalus, (3) and a combination of the two conditions. The second condition is plastic arachnoiditis. The third group is degenerative lesions associated with thrombosis. The fourth is porencephaly, a cyst-like condition of the brain which is thought to be of congenital origin, or possibly posttraumatic from birth injury. Recently, Jaffe has presented an excellent piece of work in which he assumes that the condition is due to birth trauma, and, finally, encephalography is of value in diagnosing mass lesions. Twenty slides were shown demonstrating the various lesions in which encephalography was of value in making a diagnosis.

In conclusion the following points were stressed: there was an increase in the size of the subarachnoid pathways in all of the epileptics that were studied by us. The first changes seemed to occur in the frontal region, then the parietal region and finally the basal cisternae.

Further evidence that there was an increase of air over the cortex is the large withdrawals of cerebrospinal fluid. Plastic arachnoiditis is sometimes associated with the focal type of convulsive seizures.

The procedure is simple and safe, but requires close co-operation between the neurologist, neurosurgeon and radiologist.

### PART III NEUROPATHOLOGICAL STUDIES

DR N W WINKELMAN

From the pathological angle, the subject of epilepsy has now been considered for many years. The most recent school to devote practically their entire time for a while to a discussion of the pathologic phase of epilepsy, the Munich School, under Spielmeyer, has published a considerable number of works on this phase of the problem. Spielmeyer came to this country a few months ago to tell



FIG. 6



FIG. 7



FIG. 8

FIG. 6.—Dura in relation to superior sinus—frontal section from case of typical Idiopathic Epilepsy showing absence of pachionian tissue.

FIG. 7.—High power view of lateral leucomal area showing dilation of spaces and absence of pachionian tissue.

FIG. 8.—Normal pachionian body—fibrillar stain—showing make up of normal pachionian structure.



us his conception of the pathology of epilepsy. He did say, and not without reason, that the same findings in epilepsy had been found in other conditions, and only recently one of the German journals has been devoted practically entirely by the Spielmeyer group to a study of conditions that I believe we were one of the first to call attention to. About 1927 our attention was called to a patient who died as the result of food intoxication, one of a family of five or six, all of whom have died as the result of eating some tainted meat. The brain of the youngest member, a little girl of seven, came into our laboratory and gave us an inkling of the type of changes that occur in any severe toxemia of this sort. In a great many ways it resembled the findings that have been proposed for epilepsy and considered fairly diagnostic. I am not using the word pathognomonic, because no one had then considered them pathognomonic. I am going to try to show you this evening a few slides (Figs. 6, 7, and 8) from that particular case and also a very important case that came to autopsy a short time ago—a patient who stopped breathing for a while on the operating table, during an apparently minor operation, a D and C case. The patient stopped breathing for about four or five minutes. She was revived with difficulty and lived about four or five days, just long enough, as far as we were concerned, to firmly fix the pathology for us to see under the microscope. That brain I am also going to show you, and to show you how it compares with the findings that were considered of importance in epilepsy. Our own line of attack has been from a little different angle, and I would like to begin with the slides, if I might, so that you may see the thing under the microscope.

This is from the case of food poisoning. Here you will notice very quickly the disorderly arrangement of the cortex, broken up by this little area here, with this vessel in the center, which you will shortly see under the higher power, but notice also the prominence of the very small vessels outside of the focus. This is the vessel under higher power and shows a finding to which we have called attention and on which we have laid great stress, not only in this condition but also as one of the secondary factors in epilepsy. This is from the patient who happened to die during or after the operation for a D and C, and shows a focus in here of the same type, with prominence of the small vessels, and a meningeal condition which

has proven also of interest in the epileptic problem. Now this is again from that same patient and shows what the Spielmeyer group have laid great stress on, a change in a particular region of the brain. This is Ammon's horn, a particular part of the Ammon's horn to which a special name has been given, Sommer's sector,<sup>1</sup> and shows very beautifully the degeneration in this particular area. This next is under a little higher power and shows the degeneration practically limited to this area. That is supposedly the lesion that has been put forward as one of the characteristic findings in epilepsy. The cerebellum is the second of the great points of attack that the Spielmeyer group have called attention to in epilepsy. This is not from epilepsy, but it is a case of an anoxemia, as we are choosing to call it, where there is just as much degeneration if not more, than occurs in epilepsy. There the Purkinje cells have practically disappeared, a condition you might get in severe and repeated epileptic convulsions.

Our own point of attack, as explained by Doctors Fay and Pendergrass, has been from a little different angle, we have studied the fluid mechanics of the brain, especially these pacchionian bodies, the points of exit of the cerebrospinal fluid, and have studied them in about three hundred cases to see what we could find, being aware of the fact that very little work had been done on them, and we took it as a problem of research without any definite point of view. Next slide. This is the type of brain that Doctor Pendergrass and Doctor Spiller have called attention to as the aplasias of the pacchionian bodies. I think Doctor Spiller's designation is very beautiful, because in this there has been practically an entire absence in this patient, an epileptic, of the normal eliminative mechanism of the brain (Figs. 6, 7, and 8).

Next slide. This is an example, very nicely shown, of the changes that take place in any condition where there is interference with the exit of fluid. This might just as well be from a case of paresis or any other condition where there is involvement of the anterior meninges. You see here beautifully illustrated—this is turned around a little bit, but it shows very beautifully the line of involvement shown so nicely in the preceding picture and the picture Doctor Fay showed you of this intense arachnoiditis in a patient who has a mechanism in which there is still some filtration, but the

mechanism is blocked. This is an example of what may happen in a relatively benign tumor so far as pathology under the microscope is concerned, but malignant as regards the situation, blocking the fluid pathway, the superior longitudinal sinus. Here again is a specimen showing the blockage that can take place from gross pathological lesions. Next is a secondary carcinoma, producing a blockage, here at this point and very rapidly shutting off the Pacchionian bodies and superior longitudinal sinus. This I have taken as a picture from Weed, which needs, as far as we are concerned, certain modifications. We have found that the subarachnoid space communicates with the filters. Here they are called the arachnoid villi, but in the adult they are called the Pacchionian bodies. Weed has drawn them here in relation to the superior sinus, which we have not found constant. Our own findings have been that these project into spaces out here off to one side, and the surgeons who operate on the brain tell you that they will keep away from the superior sinus for some little distance because of the very nasty, not bleeding, but oozing of cerebrospinal fluid. We have felt that these spaces do not contain blood, they are called blood lakes, but we have found them filled with cerebrospinal fluid. This is the actual preparation taken from a slide showing the relationship, and I put the other slide first to show you the diagrammatic representation. These are the little bodies. Here they are comparatively inconspicuous, comparatively small, but, as you see, they empty into these spaces or project into these spaces, and then the fluid makes its way to the superior sinus into which the spinal fluid drains. The relation here of the subarachnoid space cannot be shown with this picture, but in the next you will see a high-power view of the relations. These are the little bodies right in here that you can see. Here is another one, this is a very fortunate specimen because we are able to show the connection of these bodies with the subarachnoid space. This particular specimen was studied in serial sections, hundreds and hundreds of sections made in order to determine the relation to the subarachnoid space which we can see here very beautifully, and the structure of which you can see is identical with the structure of the subarachnoid space, a thing to which apparently very little attention has been called before. This is an enlargement, it shows the pacchionian body with its makeup, very similar to the inside of

the subarachnoid space in which is contained, as you know, the cerebrospinal fluid. Now normally this has a fibrillar makeup. This is a Klarfeld preparation and shows how fibrillar it is and how much of a network is contained within the Pacchionian bodies. This might just as well be a specimen from the subarachnoid space. The structure is just the same, and one cannot tell the difference under the microscope. Here is a little break in the sequence to show you the same type of preparation, from a typical so-called idiopathic epileptic, and when one examines this very carefully, he finds the superior sinus, and he finds the lacunae which are not filled with blood. I would like you to take notice that there is considerable bleeding at times in the dura around the lacunae, but never once have I found blood within, as one sees in the superior sinus. One looks very carefully throughout for evidences of Pacchionian structure, and only occasionally is he fortunate enough to find a little incompletely developed atrophic structure which might be taken for a Pacchionian structure.

Next slide. This is the atrophic little structure one sees at times in some of the severe malformed brains, a good many with epileptic attacks. These are incompletely developed and apparently non-functioning little nodules. This is under high-power magnification where one sees the typical cells that make up the Pacchionian tissue or arachnoidal cells clustered together without evidence of functional activity. Next slide. That is the group to which we have given the name of atrophic type, in contrast to the first, the aplasias. We have found another group, a large group of so-called wet brains, that group to which Doctor Fay has already called your attention, where the brain actually drips, where the entire brain is hydrated. The pathologists of the past have said, and Spielmeyer has only recently made the lament, that under the microscope he cannot tell hydration or edema in the brain. I would say that we are able to tell it in many cases, if your sections are run through correctly, you are able to tell edema of the brain, and this is one of the ways of telling edema of the brain. The Pacchionian structure is ballooned out like a sponge filled with water, and that is exactly what it looks like and exactly what it represents, it is enormously filled out. I was unable to get the whole thing under one low power of the microscope. Now that, under high power, shows globules of fluid within

the hydrated Pacchionian tissue, and one sees the granularity of it, to show that these are, in fact, the separation of the fibrils that you saw forming the normal structures of the Pacchionian tissue. Now our next group of changes that we have found, particularly in older people, especially in that type of condition where we see atrophy of the brain. We have called attention to the fact that probably as the result of the difficulty in the drainage of the fluid from the brain, there is a fluid mass over the cortex which acts in the same way as a flat tumor might act over that part of the brain, and we have found in comparing the structure under that with the structure in the non-atrophic areas of the brain, that we could, if we mixed up the slides, still pick them out without the labels, I could tell when some of those sections were being photographed, which particular area of the brain was under the microscope because of its rather characteristic structure, and we have put forth the idea that this is a pressure phenomena as the result of the fluid in masses in the sulci over that cortex. Now the Pacchionian bodies in that type of individual are exactly the structure of the subarachnoid space over the brain. There is fibrosis, every one has seen fibrosis of the meninges over the brain in older people. The fibrosis of the Pacchionian bodies has not been investigated to any extent as far as I have been able to see, but one finds the fibrosis quite marked in many of these brains. Now this is the high-power view of the fibrotic structure as contrasted to the edematous, where one does not find the large spaces filled with fluid as one does in hydrated brains, no matter what the cause,—alcoholism, delirium tremens, happens to be the cause from which one of these preparations was taken, and from which we get a beautiful example of the hydration that occurs in the brain. This shows again that the fibrosis occurs not only within the Pacchionian bodies themselves, but in the capsule, the arachnoid capsule, the same sort of capsule that occurs around the arachnoid space, the arachnoid itself forming the limiting membrane with the subdural and subarachnoid space, and showing the enormous increase of tissue. One of the very interesting conditions we have met with has been in the meningitic cases. We have been interested in finding out what happens to the infiltrating cells within the subarachnoid space that one sees in the various forms of meningitic cases, be they acute or chronic, syphilitic, tuberculous or

what not We have found that, within the Pacchionian structure, and this is a picture from within a Pacchionian granule, one finds the same type of cell that one sees in the subarachnoid space We can see clearly why, in the chronic forms of meningitis, there is very soon a blockage, why there is that enormous increase of pressure and why the patient dies a pressure death, and why relief of pressure produces a relief in the clinical picture Next slide This is the final slide to show, from the actual preparation, the comparison between the normal and what happens in the meningitis cases, the enormous increase because of the pushing through of the infiltrating cells, and this is the epileptic type showing the absence, or at least illustrating the absence, of the Pacchionian tissue This same condition, I might say, can also be shown for bleeding within the subarachnoid space, and we are laying a great deal of stress on the hemorrhage occurring in the new-born, and this probably accounts for some of the late manifestations that all of you, I am sure, have had and will have to deal with In conclusion, our findings from the pathological angle have shown that the changes in the brain that one meets with in epilepsy are secondary We find them in any condition in which there is a periodic anoxemia, such as there is during the convulsive attack of an epileptic as he lies on the floor We find that same type of change in anything that gives us that anoxemic period On the other hand, we have felt that the drainage of the brain is important and the fluid factor is of extreme importance in explaining some of the clinical manifestations which we see in that great group of conditions that we speak of as the convulsive state

#### PART IV THERAPEUTIC EFFECTS OF DEHYDRATION

DR. TEMPLE FAY

The results to be obtained by dehydration depend upon an adequate analysis of the factors surrounding the disturbance of water metabolism and balance in the individual, and the proper cooperation of the patient to maintain the needed fluid ratios The situation is analogous to diabetes where a non-glycosuric state depends upon proper balance of carbohydrate in the diet, and a patient who will

endeavor to adhere to the necessary routine, and, too, the securing of a *grand mal* free state requires as rigorous control of fluid balances

Dehydration as a control of major convulsive seizures is only partially effective, or filled with disappointments, if the physician is unwilling to give every effort toward an *exact* regulation of fluid intake, constantly checking against accurate urine output determinations, establishing the necessary dietary supervision to adjust intake and output variations

It will not do to simply advise patients to restrict fluid intake, as there is a distinct difference in many cases as to the level of fluid intake best tolerated by the individual. Indiscretions in diet (carbohydrate and salty foods), over-eating, enemas, ice-cream sodas and beverages that they thought "didn't count" contribute to the failures encountered. The mentally defective group are extremely difficult to manage, and often hopeless because of the tendency to lie, cheat and steal regarding fluid intake, when thirst is encountered.

It must be distinctly borne in mind that the method is a *control* and *not a cure*, and has yielded results only so long as a balance has been maintained, the results obtained have been proportional to the cooperation on the part of the patient.

A careful search for the underlying disturbance of defective cerebrospinal fluid circulation, or body water metabolism must be made, and this requires a careful physical and neurological examination. Hydration states due to deficient renal function, circulatory disturbances, hypertension, mechanical obstruction to jugular drainage and secondary causes for intermittent cerebrospinal pressure increases must be carefully sought and corrected if possible.

S. A. K. Wilson believes that approximately 20 per cent of epileptics may show an hereditary background. This group fits into the structural deficiencies and venous anomalies to cerebral drainage pointed out by Swift, existing in the lateral and sigmoid sinuses. Winkelman noted poorly developed Pacchionian bodies in many of his cases, thus offering a developmental aplasia as a cause for impaired or poorly compensated cerebrospinal fluid elimination. Approximately 80 per cent of the brains studied by Winkelman, covering the convulsive state, showed acquired disturbances in the cerebrospinal fluid circulating mechanism, and thought to be responsible for the increased amounts of cerebrospinal fluid present over

the cortical surfaces of the brain, forming an "hydraulic cast" confined to the frontoparietal areas

The encephalogram has been of great diagnostic assistance in establishing the character of the cerebral involvement if present, and the situation and extent of the atrophy that has developed. With a careful history and the encephalogram, a fairly definite idea of the probable cause of the cerebrospinal fluid block may be determined. This has been possible by direct correlation with the neuropathological findings of Doctor Winkelman, checked with repeated operative verification (see report of the Committee on Encephalography, American Roentgenological Society, September, 1929)

Where definite scars, tumors or large cystic collections of *extra-arachnoid* fluid are found, surgical intervention must be considered. Fortunately, this represents only about 6 per cent of cases, and as dehydration tends to focalize the convulsion by eliminating the *grand mal* phase, these focal organic lesions become more evident even without encephalography.

The Jacksonian attacks which characterize a focal lesion frequently persist in spite of the most rigorous dehydration, often requiring surgical removal of the organic block before relief is obtained.

In my experience covering, now, three years of observations on the control of convulsive seizures by dehydration, I have been struck by the fact that the first evidence of improvement noted when the patient has been properly balanced for fluids (two to three weeks) is a disappearance of the headaches and dulness which formerly followed the attacks. Then there followed marked shortening of the postconvulsive stupor and sleep, with the appearance of "light" attacks in the place of the usually severe ones. *Petit mal* frequently appears quite promptly in place of *grand mal* when dehydration is established, and if free fluids are again given to the patient, *grand mal* returns abruptly.

With the disappearance of the *grand mal*, under careful and maintained dehydration, *petit mal* may or may not persist. Where the minor attacks have persisted and entirely replaced the major ones, dehydration to its extreme has failed in several cases to control these transient, dazed states or spontaneous isolated jerking movements. These cases have represented the gross organic types where

widespread arachnoiditis, brain scars and tumors have been actually demonstrated by operation or encephalogram.

In the series of cases studied during the past three years, where definite cooperation was obtained and a fluid balance effected, 94 per cent have shown definite improvement under dehydration. The major attacks have disappeared entirely in some instances, there have been long intervals in others with isolated attacks following fluid or dietary indiscretions, and marked amelioration or replacement by *petit mal* in a few refractory cases.

As the majority of these cases had failed to find relief in other measures, such as bromide, luminal and ketogenic diet, the results obtained by dehydration were extremely satisfactory. As human nature has its weaknesses and a perfect fluid balance is not indefinitely possible, the occasional reappearance of a seizure is to be expected, and, as the profession must regard the condition as a symptom complex, it follows that certain cases, where fluid balance leaves ample compensation for cerebrospinal fluid elimination, may continue attack-free over long periods. In those cases where little compensation exists, slight variations in the routine of fluid or factors determining fluid storage might easily promote an occasional overload and the return of a seizure.

The results cannot be judged alone by the number of seizures which may occur from time to time any more than the successful handling of a diabetic can be discounted because of the appearance of a trace of sugar in the urine from time to time. The improved mental state of the epileptic, the increased activity, the long intervals between attacks, and then marked amelioration if occasional ones recur are criteria of improvement.

A Wassermann negative state in syphilis does not imply that the condition is cured or the infection abolished. Tertiary lues of the central nervous system cannot be cured even if the disease is checked or controlled, the pathology remains. No cure for diabetes can be obtained as the pathology remains fixed. In the same way, no "cure" for chronic convulsive seizures is possible where pathological changes have become established.

After the initial studies have been completed, the patient is placed upon a strict fluid limitation. Twenty ounces per twenty-four hours total fluid intake has been found the most satisfactory.

level in adults and adolescents. Above this level, attacks have frequently returned, below this level, thirst becomes a difficult problem.

It has been my custom to start the patient on twelve ounces total and gradually increase the intake to sixteen, eighteen or twenty as the case may indicate. Thirst is combated by hot listerine gargles, orange peel or gum to chew and slow sipping of white rock or grapefruit juice.

By the tenth day thirst is of little concern to the patient, who soon becomes accustomed to the low fluid intake. At this point, if a balance of intake and output has not occurred, the diet is dried by replacing foods of less water content for those formerly consumed. Thus baked potato for boiled or mashed, toast for bread, dry cereal with measured amount of milk or cream for cooked cereal, peas and beans instead of tomatoes, squash, turnips, cabbage, etc. Here the patient begins to show the first true signs of balance and intake and output can be made to balance within *one ounce to two ounces per week*. A variation of three to four ounces per day is unsatisfactory and requires careful attention.

The loss of fluid by skin, breath and bowels cannot be estimated, but is accounted for by the fluid in the diet when intake and output balance and weight remains stationary.

The patients lose from six to eleven pounds during the first ten days, and this is very desirable, as Gamble has shown this to be stored fluid which favors hydration states in the presence of variable overloads. With the loss of this water weight and the balance of fluids the patient shows a decided improvement in the character and number of attacks.

The patients are taught to measure their fluids consumed and the urine output each day. This record is compared with the nurses' chart and when the patient demonstrates his ability to accurately carry on these measurements alone, he is allowed to maintain his own determinations.

He is required to report each week when he is instructed about keeping careful charts, which are checked, and the necessary dietary or fluid adjustments made to establish a balance.

If cooperation is obtained, a balance and much progress may be noted within a month to six weeks, but where mental deterioration is present or lack of cooperation, several months, and, in one case, a

year was required to impress the patient with the need for careful restrictions

As carbohydrate tends to store fluids, no ice cream, candy, syrup, jelly, sweet pudding, frostings, *etc.*, are permitted. Custard, junket, jello and unfrosted cake are allowed. Three teaspoonfuls of sugar for coffee, fruit or cereal is allotted per day. Sufficient carbohydrate in the starch of the vegetables allowed is present to prevent acidosis, but limitation of excess is necessary to prevent water storage.

Salt is not permitted to be added to the diet and avoidance of salty foods required. This favors limitation of fixed base sodium, responsible for retention of interstitial fluid in the body (see Gamble) as well as assisting in the problem of thirst.

Constipation is regulated by the use of mineral oil, yeast, cascara and occasional saline purge.

The maintenance of a fluid balance of twelve to twenty total ounces per day has been possible month in and month out over the past three years with excellent control of the major seizure and the full health and activity of the individual.

Two striking facts have come out of the continuation of this method. In spite of the low urine output, there have been no signs of renal irritation or evidence of casts or albumen. Contrary to what might be expected from the older teachings, the renal system is unaffected and, in two instances where casts and albumen were present before dehydration, they promptly disappeared after the third week of fluid limitation.

The striking improvement in mental activity as well as the sense of well-being has been noteworthy. On several occasions I have urged the patient to return to the former level of fluid intake when complaints about restriction became chronic. In each instance they have promptly abandoned the higher level in favor of the former restriction, "because I'd rather be thirsty than have my spells," "I felt better when I took less fluid," or "I believe the water gives me the old headache again."

If the physician takes the pains to educate the patient, teach him the values and reasons for fluid restriction, assists in his problems, finally placing the discretion in the hands of the patient (failures will repeatedly occur in the mental defective group), the cooperative

patient carries out the program to its most beneficial results and reaps his own reward

The detailed considerations of the cases, diet and results have been taken up elsewhere (J Nerv & Ment Dis, May, 1930) and have led us to the considered opinion that hydrated states, however induced, were frequently complicated by convulsive seizures. That chronic disturbances or deficiencies in cerebrospinal fluid elimination from the *cortical* surfaces of the brain produces overaccumulation of fluid in the frontoparietal portions and gives rise to an "hydraulic cast," the pressure from which predisposes under certain conditions to normal mass reactions of the motor cortex to physiological stimuli, bringing forth a major seizure or motor explosion.

Where these seizures have been generalized and associated with loss of consciousness, they have been controlled by means of continued dehydration. That fluid limitation probably acts only to maintain a more constant relationship of cerebrospinal fluid pressure and thus prevents the periodic increase during cycles of body fluid storage is our present belief.

In this sense fluid may be considered only as one of the important *predisposing* agents to an attack, the regulation of this factor offering the best clinical means now at our disposal for controlling the major epileptic seizure.

In over one hundred cases systematic dehydration has proved more beneficial than other means now at our disposal and attack-free states have been maintained where true fluid balances were obtained. A few cases with gross organic lesions have persisted in modified attacks even on established balances of fluid.

We may conclude that the symptom complex of the major convulsive state is dependent upon local or generalized cerebral hydrated states directly or indirectly concerned with body fluid ratios. The variable change of inhibitory threshold which determines the release or control of the motor cortex to appropriate stimuli may be due to the pressure of an hydraulic cast intermittently applied to the exposed motor areas so as to predispose their discharge under proper conditions.

The removal of this hydraulic cast directly or indirectly has brought about prompt relief of the major seizures and a practical, safe and effective therapeutic regimen has been presented to control

the major attack encountered throughout the convulsive state as a whole

## PART V DISCUSSION

DR WILLIAM G SPILLER

Whether everyone accepts the views presented this evening or rejects them, he must acknowledge that this is a serious and scientific attempt to determine the causes of epilepsy and to find a means of treatment. The usual treatment employed is to attend to the hygiene of the patient, regulate the gastro-intestinal tract, regulate the diet and then, above all, to give the person drugs, such as luminal and bromide, to lessen the activity of the cerebral cortex. Doctor Fay has been a pioneer on this question of dehydration and regulation of the balance between the intake and the output, and in the *Journal of the American Medical Association* for March 8th, he has received merited praise in an editorial that represents suitably the credit that is due to him. It is a method that will be difficult to carry out in dispensary practice, it is not easy to carry it out in an ordinary hospital ward, it demands cooperation of the patient and his relatives. The patient who comes to the dispensary, and many of them who came to the wards, cannot be made to understand, they will not take the amounts prescribed of intake, they will not keep to careful measurement of the output, it is often difficult to make a mother understand that ice cream is fluid or that something else may be added, the child is thirsty, a few glasses of fluid will do no harm, and the whole method is thrown into the discard. In private practice it is also difficult, the indulgent mother will ruin the method of treatment. You have heard from Doctor Fay and will hear from Doctor Bauer, that where this method is properly carried out, it has given very satisfactory results. Doctor Fay has touched on the question of biochemistry, which plays an important rôle in dehydration. Recently Wilder has published a new symptom complex Spontaneous hypoglycemia results from disease of the anterior lobe of the pituitary body, associated with great wasting of the patient in the disease of the anterior lobe. Doctor Fay and Doctor Winkelmann, until within the past few months, have been members of the Neurological Department of the University, and I have many times talked over these problems which they have brought forward this

evening, and in my judgment they have done a magnificent piece of work. You have seen the beautiful encephalograms which have come from Doctor Pancoast's department, and presented by Doctor Pendergrass. There is no question that, in many of these cases, the atrophy is in the frontoparietal region.

Doctor Fay and Doctor Pancoast have shown that that is due to delay in the elimination of cerebrospinal fluid. I have examined, with Doctor Winkelman, his beautiful sections of pacchionian bodies, and have been intensely interested in his findings. It was he, with Eckel, as he has said himself, who called attention in toxemias and infections to the swelling of the cells of the small vessels of the brain which leads to anoxemia and produces the areas of minute rarefaction, which has also now been found in cases of epilepsy. Spielmeyer, one of the two (with Jacob) greatest neuro-pathologists of Europe, have been working on this problem. Spielmeyer has attributed these areas of systematic degeneration to spasm of the blood-vessels. Winkelman has a different view, he holds that this is due to anoxemia, a cutting-off of the blood supply through the swelling of the smaller vessels. It seems to me, I repeat, a magnificent piece of work.

#### DISCUSSION BY DR E L BAUER

It may be my life's perspective that gives me this view, but I am much inclined to believe that, from a clinical standpoint, the best results in efforts of dehydration in the relief of *grand mal* attacks will occur in children. Now I do not want to detract in any way from any adult case that has been improved or helped, but I hope you can catch them young, because I believe in this field we have a very definite group that can be aided if dehydration is done promptly. We are apt, then, to have results that will perhaps save these individuals from a certain degree of mental deterioration, etc. But, on the other hand, it may be just a little difficult to control children. However, you have seen and I have seen, certainly, and I want to call to your attention the fact that a number of children who would otherwise be buried with diabetes are today living and comfortable and happy, as a result of the use of insulin with adequate diet. I would like to go into that as a comparison, but it would take too long, for I could cite definite cases where children had no

right whatever to be alive today, had their insulin and their diet not been properly doled out to them, and in this instance we do not have the prejudice of hypodermic injections, but we do have fluids to measure and intake and output to chart. My first cases for the most part were institutional cases. Here we had very little difficulty in the beginning to get control of the attack in these children, and the problem arose later, after one year or a year and a half or two years in institutional life without attacks, the parents insisted upon taking their children away and a great many of them we lost sight of as a result of that, but the greater part of the original twenty-five cases continued attack-free for a full year. Fifty cases controlled for part of the first year have gone over into the second year, and we have added to that, so that we have approximately eighty-six or eighty-eight cases that have been under observation. The three-year group amounts to nine cases. These nine have had no seizures except when attacks have been deliberately induced by excesses in intake. The fluid increases were deliberate, they thinking there would be no harm, but it always resulted in a return of the attacks. Thus the patient cannot cheat without your knowing it.

Now it is not always wise, perhaps, to start these cases with a sudden dehydration, a sudden cutting down of their fluid intake. You have to keep them under observation. I do not think a dispensary is an adequate place to do it. Hospitalization or institutionalizing these cases should be practiced, and then they can start off with their high amount of fluid, and then you cut them down gradually and they do not miss it so much. So you start at forty ounces and cut it down to thirty-two, and twenty-four, and sixteen, etc., over a period of time depending entirely upon what you can urge your patient to do, they are not then going to complain of the thirst and great desire for fluid that they would if you just stopped them from an intake of sixty ounces or forty ounces and dropped them down to ten, they will then resort to all sorts of subterfuges to get water. You will find them cleaning their teeth excessively, sucking their wash rags, and whatnot when they wash their faces. Get them down gradually and you won't have any difficulty after you get the balance or before you have the diet to consider, too, first, because of tradition more than anything else, we include meat as one of these things to be eliminated from

the diet. That is a matter of inheritance. I am the sixth generation of physicians and they all did it before me, but I overcame that prejudice and my children get their allotment of meat and eggs, occasionally. The rest of their diet must be dry, you give them their vegetables as vegetables, their cooked cereals should be cooked thick, not watery, no strained food. Another thing, soup is moist, you must warn parents particularly about that. Every woman in the world who ever cooked will tell you that nobody ever made vegetable soup as she makes it. You must cut it, because she always uses so much meat in it and so much stock and she has it so thick and so full of nutrition that it cannot be surpassed, so that the child really ought to get that because that is more nourishing. Well now, it is not, an ounce of milk far exceeds an ounce of the best soup ever made in nutrition value, calorically as well as otherwise, and in any event we cannot use soup in this instance, because usually it is salted and the child must follow it with a drink of water, or a swallow or two of water or something of the kind. Soup is out, it cannot be indulged in. Stewed fruits we must use. Now if we use our fluid in the form of water entirely, the child is without milk, so we had better balance that. The child does get some milk with food value, and its water will, under those circumstances, but cut down as water, but it will be obtaining its milk balance. Now, given a diet of that kind, it is a rounded diet. If you use the dry vegetables, including cooked potatoes (not creamed potatoes but baked, boiled or mashed), of course there is a certain amount of water in all food. Now they can very easily spill over. If they do, then we must cut down the amount of food that we are giving them. We will cut it down from twenty-four to sixteen and gradually work it up again to twenty. If we have no attacks and knowing that we have attacks at twenty-four, we can give them twenty-two and expect them to get along. In the summertime, when these patients perspire freely, added fluid in small quantities, perhaps one or two or even three ounces, can be given, and after a period of time we can make another test of their fluid tolerance. I have found a number of these children, particularly those that had been under the twenty-four-ounce limit, could be raised to a certain extent in four or six or eight months, and some

of these cases, four of them at least, have gone for three years, I believe, and could be pushed up to thirty or thirty-two ounces without any great trouble. They are up to twenty-eight now. We are going to push them on up and see just whether they have a further tolerance for this fluid. I believe, in discussing the work of Doctor Fay, that there is a great deal in it. I will not go any further into my theories or any theories, while I have them, it would be unfair. We are, at least, in a position to show you a practical way to deal with these patients and give them some encouragement and give their families encouragement in that you will make them economically sound. Whether this matter is going to revert to a salt basis afterwards, that is a matter for the chemists to help us decide. Sometime somebody is going to tell us what a convulsion is, then we are going to know still more about it, but let me urge you to practice dehydration on these children, using reasonable care in balancing the intake and the output. If your patients are going to be children, first know something about the feeding of children from the physiological and chemical side, then you can expect to give them a maximum concentrated food with a minimum of fluid. Now most of these patients are apt to be gormandizers when you get them. All right, you will have to cut down their diet anyway. Their water retention is probably not only in the interstitial tissue referred to in the spinal fluid, but can be demonstrated subcutaneously as a water retention diet. They eat successively of sweets or of everything including sweets, and sweets are the offenders. That must be cut down. When you dehydrate these patients, they will lose weight rapidly and it will be water loss, not fat loss. These children will lose weight, but don't let them get more than 10 per cent underweight, not any more than that. If you can maintain them there so that as they grow they will not fall below the 10 per cent mark, you will have accomplished a splendid objective. If they are attack-free and you have had them 3 or 4 per cent. underweight, all right, but don't have them 2 per cent. overweight, if you do, you will be at a decided disadvantage and the probabilities are that you will have to, temporarily at least, bring your fluid intake down to uncomfortably low levels.

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FIG 1a

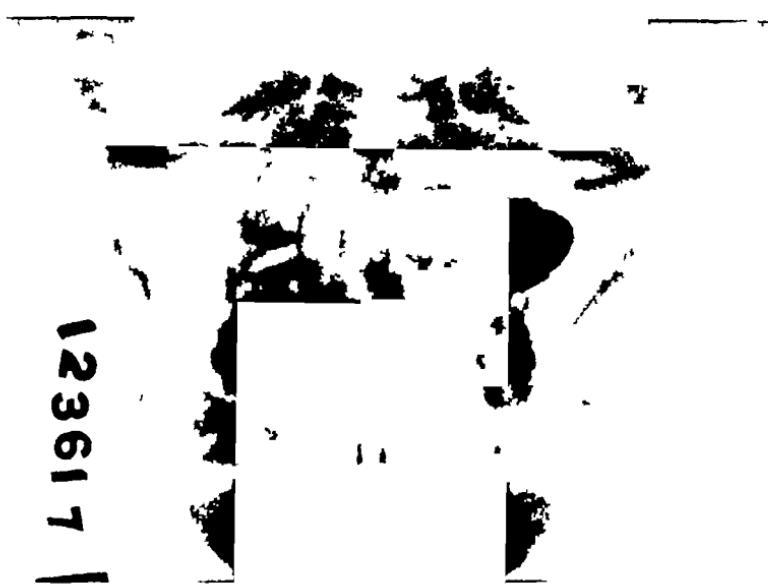


FIG 1b

FIG 1 (a b)—Leona W aged thirty five years. Pol h non-allergic. Showing fairly normal antrum lateral and anteroposterior views. Note complete filling of antrum

FIG 2a



FIG 2b

FIG 2 (a-b)—Jack K. aged thirty-seven years Polish allergic. Showing marked filling defects in both antrum and changes from normal. Note narrow antrum on left side. Operation on left antrum showed double antrum and polyps with débris in outer antrum

FIG. 3



FIG. 4

FIG. 3—Bertha B aged sixty-nine years German allergic. Showing marked filling defects in both antra. Operation on both antra showed them to be partly filled with polyps polypoid degeneration and thickened mucous membrane

FIG. 4—Sarah W aged sixty-seven years American allergic. Unequal antra. Left antrum small large amount of purulent material and thickened mucous membrane found at time of operation. This condition was also diagnosed at many previous writings

FIG 5a



FIG 5b

FIG. 5 (a-b)—Irwin M. aged five years Hebrew allergic. Anteroposterior and lateral views. Right antrum showing filling defect. Large amount of pus drains from this antrum.

Fig. 6



11898

Fig. 7

Fig. 6-Edward S. and the other two Indians. Edward S. is in the center and the other two Indians are on either side of him.

Fig. 7-R. P. seen from the side. Great shoulder  
scars damage seen in the side of the face.

Fig 8



Tony S aged forty years Italian allergic Showing lipiodol in tissue outside of antrum  
This occurred once in several hundred injections It finally disappeared after five or  
six weeks

FIG 9a

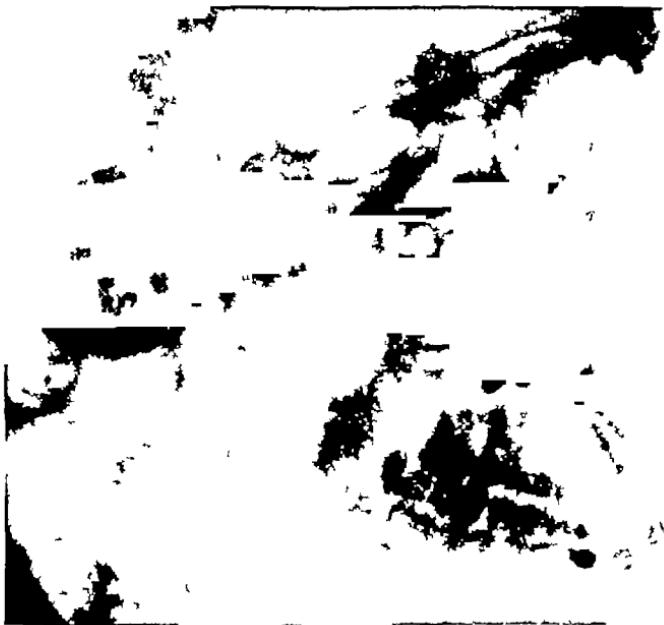


FIG 9b

9 (a b)—Toy L aged twenty six years Chinese non-allergic. Anteroposterior and lateral views. Notice curious formation of antra. Not a filling defect

1

# CHRONIC MAXILLARY ANTRUM DISEASES DIAGNOSED WITH ROENTGEN-RAY OPAQUE SUBSTANCES\*

By PHILIP S STOUT, M D

Philadelphia

IT IS some years now since the Roentgen-ray opaque substances have been used to outline cavities Proetz and others have stressed its use in diagnosing chronic paranasal sinus disease

We have used this method in several hundred antra with most gratifying results Our method is to inject, under local anesthesia for all ages— injections have been made on patients from five to sixty-nine years of age—the iodized oil or bromidized oil into the antra and have X-rays made at once, anteroposterior view and lateral view, one antrum at a time, allowing a week to intervene between the two The antrum is supposed to empty itself of the oil in forty-eight hours, although we have seen it remain in fairly normal individuals for three or four days before all has been carried out of the antrum No doubt, disease of the antrum has something to do with the slowness of emptying the oil from the antrum, but some markedly diseased antra empty promptly and *vice versa*, so that other factors, such as the size, position and number of ostia of the antrum, must certainly be a factor in the emptying of the oil In allergic patients and other chronic affections it is most important to ascertain the condition of the paranasal sinuses We were able to follow up these studies by operation on the diseased sinuses and the findings at the time of operation were the same as diagnosed by the Roentgen-ray opaque oil Iodized oil, lipiodol, was used most often Four and one-half cubic centimeters is the average amount needed to fill an antrum Bromidized oil has been tried in a few cases with good results, except, possibly, a little more pain after injection The injections must be done carefully or the oil may find its way into the tissues outside of the antra, as is seen in one of the pictures This occurred once in some two hundred injections, no special harm

\* From the Departments of Allergy, Laryngology, and Roentgenology, Jefferson Hospital, Philadelphia

came from it although it was five weeks leaving the tissues. If you suspect acute swelling of the mucous membrane of the antrum use adrenalin solution 1-1000 in the antrum before injecting the oil. We have used this in allergic cases and have not noticed any difference in the thickness of the mucous membrane. We do not inject any acutely inflamed antrum.

The conditions diagnosed and found at operation were thickened mucous membrane, polypoid degeneration, polyps, pus, bony cysts, intra with partitions, débris, etc. Although we have used other methods, including the antroscope, this method for diagnosing chronic maxillary sinus disease has proven most satisfactory of all.

The accompanying Roentgen Ray photographs will serve to illustrate some of the findings (Figs. 1-9)

## DRUG ADDICTION\*

By ALEXANDER LAMBERT, M D

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IF ONE considers the subject of drug addiction from a broad medical point of view, it will be readily seen that confining the condition to the use of the opium derivatives is altogether too narrow a conception to be of any real medical value

Drug addiction is best defined as the habitual use of any drug taken for the purpose of avoiding the emotional strains of life. It is the habitual use of a drug, to obtain a balance in the personality whenever it seems impossible to adjust the problems of existence without temporary relief

Trotter expresses it extremely well when he says that the intoxication and narcotic impulses have been almost universally regarded on the one hand as a sin or a vice, and on the other as a disease, but there can be little doubt that it is essentially a response to a psychologic necessity. In the tragic conflict between what man has been taught to desire, and what he has been allowed to get in life, man has found in alcohol, as he has found in certain other drugs, a sinister, but effective peace-maker

Probably the mildest form of drug addiction is shown in the habit of taking hypnotics. Here it is, that the worries of life, the unsolved problems which prevent sleep, are in the mildest form the expression of the wear and tear of life, which, with its worries, prevent rest and recuperation which we expect each day to obtain, when the day's work is done. The average person can face life fairly well, provided that he may obtain a night's sleep, and temporary relief by forgetfulness. With the daylight his courage returns, and many hundred years ago, the psalmist realized it, when he said, "Help cometh with the morning," and knew that daylight would bring a change of subject in his mind when the day's work began

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Probably chloral hydrate is the oldest hypnotic used for this purpose, which has had a wide use, and carried with it its habit-forming peculiarities. It is a very satisfactory drug to produce natural sleep, from which the patient wakes naturally, and easily drops to sleep again, without the annoying period of lying awake, and in the morning feels relaxed and refreshed. One or two generations ago it was a drug which had many devotees in chronic habit form, and was a habit which it was difficult to break, because at that time the profession did not understand the psychologic basis on which the habit was formed.

It causes a reduction of blood-pressure, and it produces a very comfortable sleep, but in elderly people it has the curious property of causing sleep-walking, during which the patients are able to awake partially, but do not separate their sleeping from their waking consciousness, and they are apt to act in an automatic manner, get up, and move about their rooms, or run up and down the hall half awake, and half asleep, apparently acting out their dreams in a very disturbing manner—disturbing, however, more to their family and their attendants than to themselves, for frequently the following morning they have absolutely no recollection of the trouble they have made, and insist that they have had a comfortable night. Its action on a heart already diseased, however, was not without danger, and therefore it was treacherous, often when its benefits were needed the most.

It has been most frequently used combined with the bromides, but now that we can more accurately gauge the psychic differences in the average normal of the patient, we can readily see that chloral alone, or with bromides, and sometimes bromides alone, if continued any length of time, produce a deterioration in the normal judgment of the patient (and even delusions), that makes them inaccurate in their statements and ideas, and, if persisted in, may go on to a distinct drug psychosis.

The next group of drugs used as hypnotics was the trianol and sulphonal group. The danger to those who indulged in these was a muscular incoordination on the day following, and if persisted in, there was a distinct deterioration tending towards the dementia type.

The most common hypnotic today is the barbituric acid group, it

began with veronal, it has run through an almost innumerable number of hypnotics, each chemist endeavoring to make a substitution in the chemical constitution that would leave its hypnotic powers intact, but cut out the very evident evils of perversion of personality, which these drugs show

Veronal in many instances is an evil drug, and drug psychoses, with hallucinations, delusions of persecution, and an ugly, resentful distortion of personality are common after its excessive use. In the mildest intoxications it leaves patients ill-natured, sharp-tongued, suspicious, and mean-tempered, giving them a reputation for meanness of disposition which seems so natural that people do not recognize that it is the poisoning from a drug, and the personality of the unfortunate patient is blamed for the perversion. Veronal is not infrequently used with suicidal intent, and large doses of it produce coma lasting many days, from which it is difficult to arouse the patient. When a psychosis is thoroughly established, it takes weeks, if not months, to bring about a recovery under the best conditions of institutional care.

The different forms of this group, such as the dial ciba, allonal, medinal or sodium veronal, the barbital, etc., all have their advocates, and, in carefully adjusted doses, under usual circumstances, when taken for temporary emergencies, they do not produce a harmful reaction, or if an individual is sensitive to it, the symptoms produced soon subside. It is the widespread, unrestrained use that is harmful to the community, and the unrecognized necessity of this form of drug addiction is the expression of the psychologic maladjustment of the wear and tear of life, produced by the worries and unsolved problems that force patients to turn to these addictions.

This does not seem to be generally recognized by the medical profession, and many chronic drug intoxications are not recognized. The treatment of this problem lies in the emotional training of the patient—not that all worries and problems of life can be solved by the physician, but the solution lies in forcing individuals to solve their own problems, and to realize that the solution is obtained only by facing it, and not by dodging it. Not that all marital misfits can be solved, even by the facing of the fact, nor that all petty, annoying, self-centered selfishness can equally be real—but the fact that the situation is faced, and

hypnotics is used to dodge all this maladjustment is realized, means that many patients that now go untreated and become poisoned would be relieved of their worries and their drug addictions

The problems which seemingly defy solution are met with in the narcotic addictions to alcohol and opium. Both these drugs are narcotics, and are used for their narcotic value. The fundamental basis of alcohol drunkenness and morphine addiction is essentially the same. The alcoholic who periodically drinks to forgetfulness does it on the same psychologic basis that the morphinist does who takes his drug habitually—to dodge the bitter disappointments and unhappiness of life, or the responsibilities which he is unwilling to face. It is not a question of will, it is a question of emotions, and when the emotions in the personality are too bitter, and too intense to be harbored, temporary or permanent relief is sought in alcohol, or permanent relief is obtained in morphine to balance a maladjustment which cannot otherwise be borne.

Alcohol produces in itself, when taken to excess, changes in the essential parenchymatous cells of certain viscera, and in the destruction of these, there is left behind a connective tissue replacement. It therefore leaves a permanent injury behind its excessive use.

Morphine, on the other hand, though indulged in for years, is a functional cellular poisoning, and leaves no recognizable pathologic injury. When taken away, and when the nervous tissues which were poisoned are given time to recover, they come back to the condition in which they were before the poisoning began.

A morphinist, therefore, after many years of poisoning, can return to the average normal, but an alcoholic having suffered the morbid processes of a Korsakoff syndrome is left with a personality the finer emotions and values of which are hopelessly burned out, and that personality never regains its former charm and previous sense of values.

The habit indulgence in these two drugs has been almost universally looked upon as moral degradation, but, curiously enough, in those countries in which the indulgence in one is more or less condoned, the other is condemned, while in other countries the reverse is true. That is, in the Western nations and in Japan, alcoholic indulgence is condoned, morphine addiction is condemned, in

China, India and the East, opium is condoned, and alcoholic indulgence is condemned. The morals, therefore, however strictly enforced in any one country, vary in others regarding these narcotics. It is therefore custom and convention which control, and each country condones the use of some narcotic to unhappy humanity, but sternly regulates which one shall be chosen.

The use of both these narcotics has come down to us from ancient, probably prehistoric times. Both have been used for centuries in medicine, opium coming to us from that brilliant Arabian culture of the Middle Ages.

Alcohol is used the more often of the two to cut off emotional inhibitions, and the feeling of restraint which prevents freedom of speech and action, which otherwise the normal self-control would restrain, or custom and convention inhibit. This is seen by its universal use in youth to cut off inhibition, that their emotional life may be enjoyed and lived more fully. Youth learns readily that in alcohol there is an easily accessible substance that quickly removes the sense of responsibility, and quickly gives relief from restraint, and the wear and tear of life. Later, when the worries and struggle of life bear too heavily on them, and the personality, as middle age is reached, cannot carry the strain of existence, alcohol is known to be the quickest-acting narcotic, producing a temporary relief in consciousness, and its excessive use will probably be condoned. Age, however, uses it to forget, and obliterate the failure of one's hopes, and the defeat of one's cherished plans, and the memory of the overcrowding bitterness of life.

Morphine, on the other hand, is used by those who begin life with inadequate personalities, those whose environment has forced on them a bitter realization of poverty and lack of opportunity, and in whom the struggle for existence seems in the very beginning a hopeless fight against forces too great to be overcome. It forms in that type of inadequate personality in their youth, a balance that enables them to muddle along in an existence whose bitter edge is blunted.

In many of the morphine addicts today, this evidence of inadequacy of personality is the striking feature that crops out in any endeavor that is made to help them. The majority of them show that tendency towards dementia praecox which brings with it the

peculiarity that they never can get in touch with existence in such a way that their problems can be solved. Not that they are insane, but their intelligence, however keen, does not control their actions. Although they may be sufficiently intelligent to succeed in life, their actions spring from uncontrolled emotional stimulation, and when their minds are filled with antisocial resentment, they fall easy victims to the chronic indulgence of the opium group. The solution of their problems at times appears fairly hopeless, because they fundamentally have no desire to reconstruct themselves, and there is no cooperation on their part for such reconstruction.

Morphine addiction is often acquired in the justifiable struggle to obliterate physical pain, many of these patients acquired it through legitimate use, under legitimate medical prescription against sickness, and physical suffering. Public opinion in this country, unhappily, does not make any difference in the condemnation of these unfortunates, but classifies them all in the psychopathic class of those who are unwilling to face existence. In the care of these, as we shall see, there is a vast difference in the prognostic value of the successful elimination of their habit. This class wants to be free, and, if given the opportunity, remains free. It is the unhappy psychopathic group with maladjustment of their existence, and malformation of their personality, which are the difficult ones to help.

Considering the alcoholics as narcotic drug takers, for such they are, they distinctly show two types of alcoholic excess.

Youth, in the vast majority of instances, as we have said, drinks to enjoy life more abundantly. Uncertain of themselves, ignorant of racial experience, and lacking in the experience of life, vigorously resenting all authoritative restraint, alcohol is used by them to inhibit all such restraints, to blot out all realization that they do not know, and they are determined to experience for themselves the full emotional rush of life, without intellectual inhibition, believing that they can answer their questions and solve their problems more fully by so doing.

In youth, imagination and emotions enormously predominate over intellectual processes, and over the controlling influence of judgment, for judgment, the most valuable of mental attributes, develops the most slowly.

Habitual drunkenness is, under these circumstances, not the

thing desired. It occurs because youth is determined to take enough alcohol to obtain the fullest results. In the majority of instances experience soon teaches that this form of alcoholism is not the answer to life, nor the solution of its problems, and with its lack of value as such, is, in the majority of cases, discarded.

To those, however, who cannot, or who have not been taught to adjust their emotional balance to their environment, and their life, alcohol is an easy method of balancing a mental deficit. It cuts off the sense of inferiority, it blunts a sense of failure, it possesses above all drugs that sense of what London called "White magic," that when under its influence, whatever we did or said, no matter how inaccurate the fact, it all seemed to be the most perfectly done, and the most brilliantly said.

Alcohol's earliest toxic effect is shown in its atrophy of judgment, and its hypertrophy of self-conceit. Many individuals cannot believe how sensitive they are to small doses of alcohol, a single cocktail taken on an empty stomach shows within a short time its toxic effect. There is the mental inhibition, or there is the evidence that that personality is saying things it would have left unsaid, or doing things it would have left undone without the alcohol, and when that occurs, moderation has been exceeded, and that personality has taken an excess of alcohol, which, if continued, is sure to bring harm or injury to the mental and physical makeup of the individual.

Individuals sensitive to alcohol drift unconsciously into its habitual excess and soon, if a single drink is taken, they go on to a sure excess which may end in several days' debauch. The social customs of our race are such, and have been from time immemorial, that alcohol is interwoven with good fellowship, and not a few unconsciously drift into an excess that has an unconscious, and not a vicious origin.

By the time a man reaches the early thirties, he knows whether he can see his opportunities opening before him, and whereby a determined struggle will bring him success. The determined struggles require hard work and application and self-restraint, and cannot be won with an alcoholic handicap added to it. In this period the greatest number of young men give up their alcohol, if they have

been drinking to excess, but if they go on, they get into the pathologic point of view in which, like older men, they drink to forget

The older group of alcoholics, those who have been through life, and felt its failures, have been through unhappiness and felt its burning sting, or those who, having tried, and through some uncontrolled factors have failed, find in alcohol its full narcotic value, and they learn to use it for its pure narcotism. These men do not get drunk because they drink, they drink that they may obliterate consciousness, and its unhappiness, and as they return to consciousness, drink again that they may not come into the suffering of conscious existence. Alcohol has from time immemorial been life's last remaining solace to those who go down in defeat.

In treating these patients, it is useless to argue with a mind that is poisoned by alcohol, it is waste of time to try to rearrange and appeal to a befuddled intellect, hoping to rearrange the balance of the emotional control. The first thing to do with an alcoholic is to put him to sleep, and see that he sleeps quietly, long enough to unpoison his nervous tissues, and free his body from his narcotic. As soon as possible a vigorous mercurial purge aids enormously towards this result. Ordinary hypnotics in ordinary doses are insufficient to deal with patients already poisoned by alcohol.

One of the best drugs is paraldehyd, disagreeable as it is with its repulsive odor on the breath in the days following. Two drams, repeated in a half-hour, if the patient is not asleep, is the moderate dose for the average patient. This drug had better be given with orange juice and a little whisky, which takes the repulsive taste away from it, or it can be given simply with the orange juice, but if none is at hand, then it had better be given in ice-cold water. This drug has the advantage of acting quickly.

Another excellent remedy is a combination of chloral, codeine and hyoscyamus. Twenty-five to thirty grains of chloral, one or two grains of codeine, and thirty minims of tincture of hyoscyamus—at a dose, is an excellent hypnotic, with this, however, in prescribing it to an alcoholic, should always be mixed the tincture of capsicum, tincture of ginger, or some such stomachic, that will stimulate the stomach to absorb. The alcoholic gastritis is notorious for its inability to absorb medication, and the gastric mucous membrane

should be invariably stimulated by some such drug as capsicum or ginger

If we use the amount necessary to put the alcoholic patient of the barbituric group of hypnotics asleep, in my experience, when the patients wake up, they are resistant and antagonistic to any suggestion, and are not amenable to treatment. It makes them non-cooperative, and an alcoholic, feeling sick and unhappy, in an ugly resistant mood, is a disagreeable patient to have anything to do with. There is no use adding to the difficulties of the situation by increasing the perversity of humanity. These unhappy souls are only too eager to grasp at any excuse by which they can dodge the responsibility of freeing themselves from their narcotic. The barbituric acid group of narcotics adds to the normal obstinacy and resistance of these patients.

As to the amount of whisky or alcohol to be given to an alcoholic coming out of his debauch, as a general rule, the quicker they are cut off, the quicker they recover, but that is a rule, and not a law. It is easier to win their confidence by tapering them off than by cutting them off. Older men should be tapered off, but the younger the man, the quicker he should be cut off abruptly.

The alleged thirst for alcohol is exhibited only in the first twelve hours after their debauch, as they are recovering. If a patient has obtained the temporary relief he sought, and is disgusted with himself, and his intelligence is beginning to control him, he is often anxious to be rid of his alcohol, and is anxious to be helped to cut it off quickly and abruptly, but most of humanity cling to their narcotic as long as they are allowed to.

Nearly all periodic drinkers, and especially women, drink from the pathologic point of view. There is something in consciousness of which they will not and cannot face the bitterness. In youth it is the disappointed affections, and the bitter tragedies of personal friendships. As men grow older, it is their failures in the economic side of life, it is their inability to get along and succeed, or disappointed ambitions which crowd to the fore. Of course, all through life it is the maladjustment of hidden harm and hidden distortions which have to be sought for, and have to be worked out, but it is invariably a psychologic readjustment that has to be made. The more positive and conceited a patient shows himself, the more surely

may one be convinced that he is dealing with a defense reaction, that is, hiding the real reason, which the patient is unwilling to bring out and face

Most of humanity are concrete thinkers, unable to abstract their thoughts, unable to appreciate that it is the emotional impulse in life which is the mainspring of action, prompting their actions, whether it be to drink, or to perform any other act, and that they can be just as willful and just as strong-willed to get and take their narcotic as to do any other act in life. This they do not wish to realize, but think that there must be some excuse, some reason that will relieve them of the responsibility of their acts. They therefore turn toward concrete ideas, and believe that there must be some drug, there must be some method of treatment, there must be some substance, that if handed to them, will prevent their drinking. Their relatives and friends beg you to give them something secret in their tea, that unknown to the patient will prevent his going out, and raising a glass of whiskey to his lips. They look for a concrete medicine that will act as a chaperone physically to stop them from doing a physical act.

All alcoholics are the most suggestible of human beings, and very often an impression can be best made upon them enabling them to regain their self-confidence, and to regain their willingness to try for a reconstruction, by giving them some definite routine concrete line of treatment that appeals to this universal suggestibility. On this basis have grown up a large number of definite, concrete, so-called "cures." They are useful through this appeal to suggestibility, but, used alone, they fail. Often they are of great use if combined with a psychologic rearrangement of the patient.

It is not necessary at this time to go into all the innumerable psychologic details of each type of personality and its varying conflicts. To treat these patients successfully requires unending patience and a cheerful charity regarding human frailties.

There is one peculiarity possessed by these patients that should never be forgotten—they never try to do any better than they think that the physician who is caring for them expects them to do. They are always looking for an excuse not to try. It is in these patients that the human mind best shows its unlimited power of self-deception.

Considering next the morphine addicts, it is in this form of drug

addiction that the idea that there is a definite addiction disease has taken the firmest hold, based on the theory that an infectious disease produces a definite immunity against continued minute doses, or that one attack protects against another, and that it must develop some antibody in the human organism. It has been held that the morphine taken produces some resisting antibody, and that there was a definite distinct entity of so-called addiction disease following its use. This could never be proven, but it made a very attractive theory, and a very attractive picture to justify the taking of the drug.

Recently the work of Light and Torrence in Philadelphia has finally answered the question of the existence of such a disease. These investigators have carefully tested out in completely controlled conditions the physiological processes of the human body in addicts, and have compared them with the normal averages of the non-addicted. They have found that persons addicted to morphine do not differ in their physiological processes from average, normal non-addicted persons. The result of their researches has resulted in a negation, no evidence of an addiction disease can be found. This work is of the greatest value, as it places on a scientific basis the fact that the taking of morphine does not produce physical disease, nor does it produce morbid processes which show that the normal functions of the body are distorted by the morphine beyond what may occur in normal non-addicted people.

At the same time, there were in these same addicts no physical neurological changes found. This forces the whole question into the realm of changes of personality, which places these classes of patients definitely in the psychiatric side of medicine. We are accustomed to the average person which we designate as normal, but this normal is not a thin line, but should be considered on a broad plain as human normal beings vary widely, but are still normal. We recognize that individuals differ in their intelligence, and in the brilliancy and dulness thereof. We recognize that individuals vary in their emotional susceptibility, and in the intensity in which they react through these various emotions. We realize that men differ enormously in the intellectual control of their emotions, and in the intellectual control of their actions, thus building up the picture of character.

The various distortions of the human mind

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the broad category of the various forms of insanity, but between the normal of the average individual, and the distinct insanity as recognized medically and legally, there are many inadequate psychopathic personalities, not so much inadequate in the stupidity of their intelligence, as inadequate in their balance between intelligence and control of their actions in life. The intellect, however clever, does not control their actions, their actions appear as illogical sequences to their intelligence. They are not legally insane, but they show many of the same mental anomalies as the insane, differing only in degree. It is this class of humanity that cannot bear the stress of life. They do not have the resistance to go on against the wear and tear of life, they do not have the ability to conform to the usual conventions of society, and because public opinion criticizes, and resents their actions, they, in return, develop antisocial, resentful ideas. It is among this class of mentality that so many of the morphine addicts develop, morphine blunts the sense of responsibility. It blunts the necessity of conforming to anything except a self-willed selfish contentment.

In the recent work of the Mayor's Committee on Narcotic Addiction of New York City, 87 per cent of the 318 addicts were of this inadequate personality type, and 42 per cent were of the mental type that tend toward an early dementia praecox, there were few that tended toward the manic depressive group. As is well known, this dementia group shows the hypersensitive shut-in type of individuals that are exceedingly self-centered, and are easily hurt, and are resentful, but cannot arrange their personalities to harmonize with their environment. The manic depressive group, on the other hand, are more in touch with their existence, but they are unbalanced, varying between an excessive elation, and an excessive depression.

It was noticeable that only about 13 per cent of the group of addicts studied under this committee really conformed to average stabilized personalities. It is thus very evident that this psychopathic class of addict is vastly different from the persons of average stabilized personalities, who become injured or afflicted with painful diseases, and acquire the habit of morphine taking in an endeavor to be free from physical pain. It is worthy of repeated emphasis to state that this latter class is usually classed with the psychopaths, and condemned by public opinion equally with those who take

morphine to balance their personalities. But, if once rid of their morphine, as we have said before, in the majority of instances this average stable personality will stay off the drug and not return to it.

It has been simply the fear of the suffering, and the inability to be rid of their morphine without intense physical distress that has made them go on, hating it, and hating the odium connected with it.

The work of Torrence and Light in Philadelphia under the New York Committee for the Study of Drug Addiction had cleared up so completely the physical reactions of morphine in the body, that the Mayor's Committee on Narcotic Addiction concluded that it was their duty to study the various drugs that were used in the treatment of drug addiction. For that reason, the work that had been done in the Penitentiary on Welfare Island was continued, using a substance that was at that time believed to be of great value in the treatment of morphine, that is, narcosan, and narcosan was further studied under the strictest controlled conditions.

Hyoscine and atropine were also tested in a similar manner, and then the reduction treatment of morphine was taken up, in which no drug treatment was used, but the morphine gradually, but surely, reduced. A short experimentation followed with the use of codeine to relieve the symptoms of withdrawal of morphine. All these separate tests required time in a small ward, with but few patients at any one time. But with the strict control, accurate estimates were obtained. Graphs were prepared showing the curve of each drug compared with an equal number of controls during the withdrawal period of morphine. The controls received no narcotic, unless their condition became such that they were in danger of severe collapse. They were given hypodermics containing Bismarck brown and glycerin in sterile water, and were given it as regularly as the patients receiving the various medications. The symptoms were divided in four classes first, the gastro-intestinal group, with nausea, vomiting, abdominal cramps and diarrhea, second, the muscular discomfort group, with aches and twitching, third, the restlessness, mental and physical group, with increased psychomotor activity, fourth, the group whose symptoms were prostration, subjective and objective weakness.

There were 100 patients used for controls. The record of their symptoms gives us a curve which can be used as a standard, and any

treatment used during the withdrawal of morphine can be compared in future with this curve to judge the efficacy of its action

The accuracy of the observations was carefully checked up by one man's judging the symptoms, another man's deciding on which patient should be a control, or obtain the treatment under observation, and the nurses' in charge not knowing what was being given, or to which patient the control medication, or the actual medication, was being administered

Beginning with narcosan as a treatment, the results show that the gastro-intestinal symptoms under narcosan are much increased over the controls. Muscular discomfort and aches and twitching come earlier in the narcosan, rise higher, and then diminish equally with those of the controls, the restlessness is practically the same in narcosan as in the controls, the prostration is during the entire treatment, slightly more noticeable under narcosan than in the controls. In the previous experimentation with narcosan it had been believed that controls were not necessary, as we were familiar with the reduction symptoms of morphine. This proved to be an error of judgment, as it was not realized at that time how self-limited the withdrawal symptoms of morphine are. It is evident that in the controls receiving no morphine the symptoms are limited to seventy-two or ninety-six hours, and while it is also evident that patients, through the intensity of their fear, or through the intensity of the collapse produced by the withdrawal of morphine, may die from sheer nervous collapse and exhaustion, that if morphine is given to prevent this collapse, the patient suffers for seventy-two or ninety-six hours, and then there is a rapid reduction of the symptoms.

The insomnia is a very trying symptom after the withdrawal of morphine or the opium narcotics. Whether or not it returns quicker after other drugs have been used than in the controls, has not been recorded, and it is not possible to say.

The next drug to be tried as a treatment was the atropine treatment. It is evident from the curves that those receiving atropine show about the same intensity of symptoms as the controls, but that the recovery from their symptoms is prolonged, and they recovered more slowly from their symptoms under atropine than the controls. The gastro-intestinal reaction is less severe under atropine. Their muscular discomfort is not quite as severe, but remains distinctly

longer. Their restlessness, however, is more intense under atropine than in the controls, and their prostration occurs quicker, and is more prolonged, and is slightly more intense.

Under hyoscine it is evident that patients suffer more than the controls, their suffering does not begin as soon, it rises to its climax at the end of forty-eight hours of treatment, and the gastro-intestinal symptoms are markedly increased under the hyoscine. Their muscular discomfort is practically the same as in the controls, and their restlessness and delirium and mental and physical activity are enormously increased under hyoscine, as well as is their prostration, which is more intense in all periods of the treatment, beginning earlier, and lasting markedly longer.

These findings here agree with our previous clinical experience, that patients being taken off under the hyoscine treatment suffer for days, or weeks, from a bodily and mental exhaustion, which is one of the most marked features of the treatment.

A seven-day reduction of morphine patients was tried, in which, compared with the controls, the patients suffered materially less, but it was simply a prolongation of their suffering, at the end of a week they were cut off from their drug, the withdrawal symptoms came on, but in all with very marked diminution in intensity. The patients, however, were less easy to care for, they were irritable, mean, more quarrelsome, and more difficult in every way to manage. It is interesting, that after the morphine was cut off from these patients, as the graph shows, they still had about seventy-two hours of increase of symptoms. With a fourteen-day reduction, it is noticeable that the gastro-intestinal symptoms are reduced to a minimum, and their muscular discomfort, however, increased, with a rising curve towards the day that their morphine ceased to be given to them at the end of two weeks, and then flared up for forty-eight hours, and rapidly diminished. Their restlessness was diminished over the controls, but in a rising curve, until it also disappeared, and their prostration shows a similar curve, but to a less degree.

The next method of treatment was an endeavor to ascertain to what extent codeine would control the withdrawal symptoms of morphine. Our clinical experience had taught us that codeine does control it, and that codeine is so rapidly discharged from the body by the kidneys, that it is not stored up as long as morphine, nor does it

possess the narcotic value to the human organism that morphine does. It produces sleep, it alleviates pain to a marked degree, but that curious narcotic value it does not possess, and codeine habits are exceedingly rare. In 1700 patients in private practice, all of whom were treated for many different kinds of narcotic addictions and combinations, between the various habit-forming drugs of the opium group, or the hypnotic chemical group, it was found that only ten of them were addicted to codeine, and these had acquired it through their endeavor to alleviate pain.

In those taking rapid reduction with codeine, the curves show that at the end of the week, when the morphine was cut off, there were the regular three days of increase of symptoms after the codeine was also cut off, but these symptoms did not rise as high as with the seven-day reduction, nor as high even as the symptoms after a fourteen-day reduction.

In other words, after the codeine has been cut off abruptly, the symptoms of the deprivation of the narcotic are not nearly as intense, although the curve is a much broader and blunter one, when it suddenly ceases at the end of three days.

Since carrying out these experiments at Bellevue Hospital, it has been found in private practice that if the codeine is continued a few days beyond the morphine, and is tapered off rather rapidly, that is, taking four or five days to taper the codeine off, the symptoms are reduced to a minimum, although there is a sense of irritability and restlessness, but even that is nothing compared with the usual withdrawal symptoms. In other words, the withdrawal symptoms do not go beyond the intensity of the disagreeable restlessness, produced by the cutting off of any narcotic. The gastro-intestinal symptoms disappear, the muscular discomfort is at a minimum, and the restlessness is the most marked of the symptoms, but that soon ceases. It is evident, therefore, that codeine is the only drug that really modifies materially and successfully the withdrawal symptoms of morphine.

The best method of giving this treatment is to calculate the amount of morphine in terms of Magendie's solution that a patient is taking in twenty-four hours, then for a ten-day reduction, diminish the morphine each day about one-tenth. As the morphine is best given at four-hour intervals, the amount is again divided by six as there are six doses a day, and the amount of reduction is easily

calculated in the number of minimis of Magendie's solution. For instance, if the patient is taking the equivalent to 120 minimis a day of Magendie's solution, he is taking twenty minimis every four hours, if he is to be reduced twelve minimis a day, he is reduced each day at each four-hour dose two minimis of his Magendie's solution, in this way in the ten days his Magendie's solution is brought down to zero. But at the same time that his morphine is reduced, the codeine rises from the second day beginning at one-half grain every four hours the first day, then a grain every four hours the second day, then three grains every four hours the third day, four grains every four hours the fourth day, and five grains every four hours the fifth day, and it is given in solution with the Magendie's solution. It is wise to use the codeine phosphate because of its greater solubility, and if the codeine solution is made up in the same form as the Magendie's solution, it is easily accessible. The desired amounts can be given every four hours in the same syringe as the Magendie's solution, and, in this way, the patient does not know when the morphine ceases to be given to him. If this amount of codeine is not sufficient, extra doses of codeine can be given without harm to the patient, or to his reduction treatment. This large amount of codeine is apt to be very constipating, and the patient should receive the amount of cathartics that is necessary to keep the bowels in good action. Severe purging is not necessary under this form of treatment, as it is apt to irritate the gastro-intestinal tract. Of course the intestinal tract should be thoroughly cleared out before beginning the treatment, it is also wise to test out the patient for the first twenty-four or forty-eight hours of treatment with the amount of morphine that the patient tells you he is taking, to see whether or not he is comfortable. Morphine patients always have the defense reaction, and the fear of being condemned for the amount they take, and are often inaccurate in their statements regarding the amount taken.

The advantage of this codeine and morphine treatment is that they suffer so little, there is no occasion for deception, there is no question of a defense reaction for fear of suffering, they get off their treatment without the irritability and fear of suffering that the abrupt methods, and old methods of treatment gave them, so they are very manageable.

Of course, if you are dealing with patients that don't want to recover, that don't want to be taken off, if you are dealing with a

large mass of psychopathic addicts with inadequate personalities, who make no attempt at reconstruction, you will deal with every sort of deception and every known form of resistance, and lack of cooperation. But in private practice with those who have been caught in the toils of the narcotic habit through legitimate medication, or through the existence of pain, this treatment is very easily administered in a hospital, and they can easily be taken off their narcotic.

All morphine patients after they are once off should be reconstructed physically as well as psychologically, and the best method of this is through physical exertion, exercise or work, and after they have become built up into good physical condition, the sooner they get to work and occupation with the rearrangement of their psychologic distortions, the better and the quicker will they be able to face existence cheerfully without their drug.

Sleep comes to them gradually during their period of treatment, and in the restless period of the few days as their morphine is cut off, or their codeine diminished, hypnotics are very difficult to administer. Sodium amyta and practically all members of the barbituric acid group, if given in sufficient amounts to really make patients sleep, and influence at all the withdrawal symptoms, must be given in amounts that poison them. In the endeavor to obtain sleep for these patients, the poisoning from the various hypnotics given, even up to the point of delirium from them, has been a noticeable feature. It is harmful, in my opinion, to push hypnotics as far as this. It only adds to the poisoning of the patient, and does not relieve the withdrawal symptoms, but adds to the difficulties of the situation.

Chloral with codeine and a little hyoscyamus is again a very useful hypnotic for these patients, but even this cannot be continued too long. Patients must be made to fight out their lack of sleep by endeavoring to read, or by taking hot baths, or hot packs, which relaxes them. They gradually obtain sleep more and more each night, and if they can be made to take physical exercise followed by tonic baths in the daytime, they can, through this physical exertion, obtain their sleep quicker than otherwise. The question is often asked, what can be done for the inadequate group of personalities that form the ever-recurrent narcotic addicts in the penal institutions? It is only through forced confinement, and learning some

trade, and working at some definite work, that these patients can be trained and reconstructed. Occupational therapy in forced confinement is the best solution. This will slowly regenerate a larger number than can otherwise be done. If at the same time an endeavor is made to take these patients individually to reconstruct their distorted mentalities and distorted views of life, a great deal can be done to diminish their number, but this is a problem which should be undertaken by the State, just the same as the State today undertakes the care of the insane. These individuals should be regenerated, and treated like those who are unable to lead a more normal existence, and should be treated, not as if in a boarding house for permanent care, but should be taken and treated like those who are mentally ill, and through persistent treatment can be reconstructed.

It is at present hopeless to take care of certain individuals of both drug addicts and alcoholics without the power to deprive them temporarily of their liberty, and force them through institutional care and reconstruction to reorganize their lives and their mentalities. This, at present, the law does not permit, but until it is done, many inadequate personalities will continue to seek their peace of mind in narcotic addiction.

## THE INTESTINE OF PELLAGRA\*

(SECOND PAPER)

By KENNETH M LYNCH, M D

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IN 1916, I made a report of the postmortem study of the intestine in pellagra,<sup>1</sup> in which it was given as my observation that the pathology of the condition is so characteristic as to give the term "pellagrous intestine" a definite meaning

Further experience in postmortem study of this disease has so confirmed this report that it is considered worthy of supplement and some elaboration

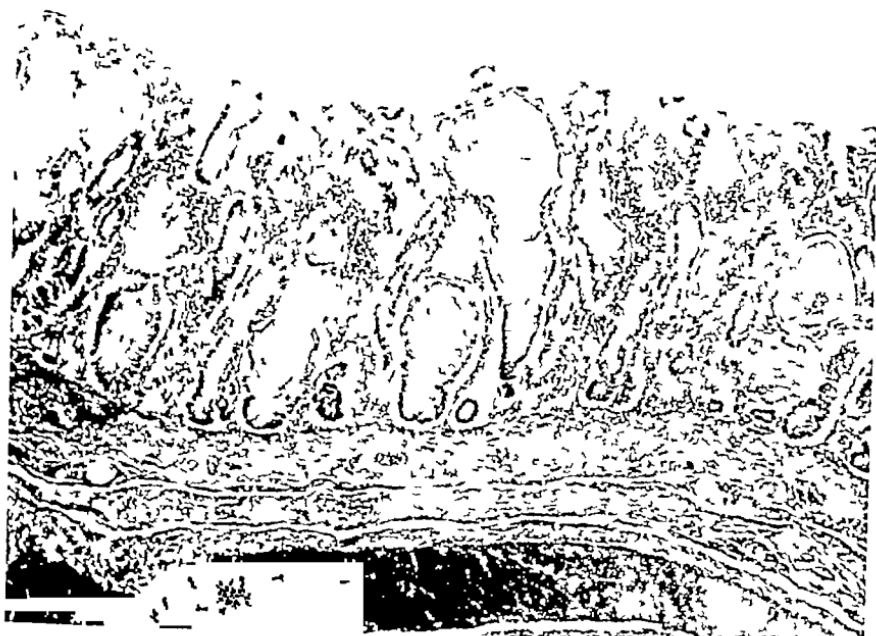
The inflammation of the intestine associated in the disease pellagra is practically limited to the colon, in the aggravated state extending into the last part of the ileum. The caecum, the sigmoid colon, and the rectum are more extensively involved, even when there is a general colitis, and in the mild forms these parts may be the only seats of alteration

The wall of the involved parts is thickened and the peritoneal surface may be abnormally fibrous. The mucosa is thickened, congested, and the surface is usually more flattened than normally, with less plication. It is toughened in its thickened state, sometimes to a leatheryness, and it may have a bronzed tint to the red color. Usually there are no gross ulcers, but in the aggravated state superficial ulcers, shallow and granular, with irregular outlines and without elevated edges, may occur and may even be extensive. These ulcers have occurred in my service mainly in the caecum, at times extending over the ileocecal valve, rarely in the pelvic colon. They are usually limited to the mucosa but may extend into the submucosa. I have seen extension through the cecal wall with complete perforation in one case only. In severe form of the colitis the appendix may be involved in the process, with thickening and fibrosis of the wall, and a smooth, heavy, velvety, congested mucosa

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FIG. 1



INTESTINE OF PELLAGRA

Cystic mucosal glands with hyalinized epithelium of mouths and accumulation of mucus and keratinoid material of desquamated epithelium. Mononucleosis. Fibrosis. Engorgement of vein of submucosa. Photomicrograph X110

FIG. 2



INTESTINE OF PELLAGRA

Hyalinization and flattening of epithelium of glands of mucosa and cystic dilatation with cell detritus. General mononucleosis and fibrosis with involvement of nerve centers. Photomicrograph X110

FIG 3



INTESTINE OF PELLAGRA

Ulcer of mucosa with inversion of edge Mononucleosis fibrosis and arteriolar sclerosis at the base in submucosa Photomicrograph  $\times 91$

The distribution of the process, the flattened, deep red or bronzed, thickened mucosa, and the shallow irregular mucosal ulcers, are the particular gross features

The microscopic picture is equally interesting and characteristic

The mucosal changes include hyperemia, degeneration and desquamation of surface epithelium, increase in interglandular mononuclear and connective tissue cells, and a peculiar degeneration of epithelium of the glands with cystic dilatation of these glands. The glandular epithelial degeneration appears to be the particular feature of the pathological process. That of the mouth and neck of the gland undergoes a hyaline transformation which reminds one of the keratinization of squamous epithelium. It does not appear to be an actual metaplasia to stratified squamous epithelium although the resemblance to squamous cells is sometimes noticeable and the cast-off cells remind one of keratinous material. The cells become flattened, the outlines appear fused, the cytoplasm hyaline and more acidophilic, the nucleus at first enlarged and then condensed as the process reaches a stage of flattening and apparent atrophy of epithelium. The mouth or neck of the gland apparently becomes occluded by degenerated and cast-off epithelium and the gland undergoes a cystic distention. The epithelium at the bottom of the gland appears to become affected only by this cystic accumulation of débris and dilatation of the gland. Usually the epithelium of the depth of the crypt is not hyaline but may even appear proliferated, although in the large distended glands it may become degenerated and atrophic.

Leukocytes are not a prominent feature of the accumulation in these cystic glands until later, when apparently the stagnant material may become infected and the content change into one of purulent or near-purulent type. Then the lining epithelium undergoes necrosis.

This apparent infection of the cystic glands may well be the beginning of the process leading to active inflammation of the mucosa, submucosa, and other coats, to thrombosis of mucosal and submucosal veins and lymphatics and necrosis with ulceration.

While the leukocytic accumulation and encrosis of the epithelium of cystic glands may be present, many of these altered glands of the same region may apparently remain uninfected, the glands lined by atrophic, flattened, hyaline epithelium, and the dilated crypt filled

with a stringy or laminated mucoid or keratinoid substance, showing the pyknotic epithelial nuclei and a few leukocytes

The submucosa is the seat of marked congestion, the veins being especially distended with blood. There is in this coat a progressive growth of fibrous tissue and a diffuse infiltration by mononuclear cells, large mononuclears, lymphocytes and plasma-cells. In the aggravated states the accumulation of such cells is prominent and tissue spaces and lymphatics may be choked with mononuclears. Plasma-cells and lymphocytes occur scattered about.

Depending upon the degree of severity of the process a similar cellular infiltration and fibrous tissue proliferation occurs in the muscle coats, between the bundles and layers of muscle, and in the serosa. The latter is not uncommonly the seat of marked mononuclear, lymphocyte and plasma-cell infiltration, congestion, and increase of fibrous tissue, to thicken it by several times.

When ulceration is seen it is usually limited to a loss of the mucosa. The edges of the ulcer are slightly undermined, the epithelium of the border inverted. In the edges the cystic mucous glands are apt to be conspicuous. The base of the ulcer is usually formed by submucosal tissues, with the congestion, cellular infiltration and proliferation prominent at the base and below it. Extensive and deeper ulceration may show necrosis of the border tissue with polymorphonuclear leukocytosis, in addition to the other cells.

The lymphoid tissue of the inner coats seems to be affected only as involved in the general process, and the draining lymph nodes are only moderately enlarged, with a mild grade of simple lymphadenitis.

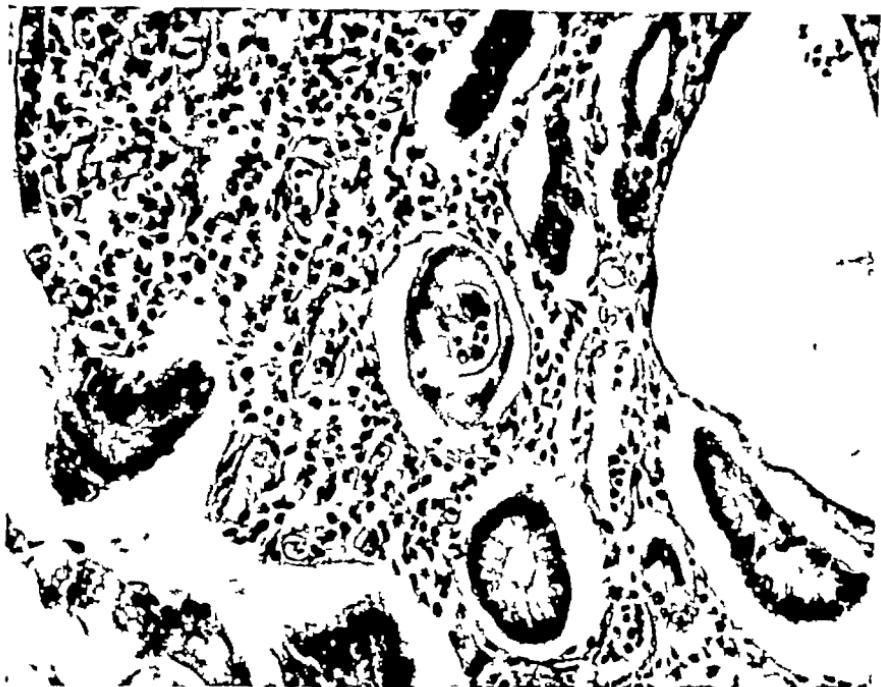
In long-standing cases of mild or moderately severe character the overgrowth of fibrous tissue progresses to a definite fibrosis and atrophy of mucosa and submucosa with conspicuous hyaline fibrosis of the latter. This is the state which one finds as the usual description of the intestine changes in pellagra. It is probably to be looked upon as an end-result of long-standing inflammation with scar tissue formation.

Even in cases of active colitis, with death during an attack of the disease, old fibrosis of the submucosa may be conspicuous and there may be portions of the colon showing only fibrosis and atrophy.

In cases of this chronic process, sclerosis of the small blood-



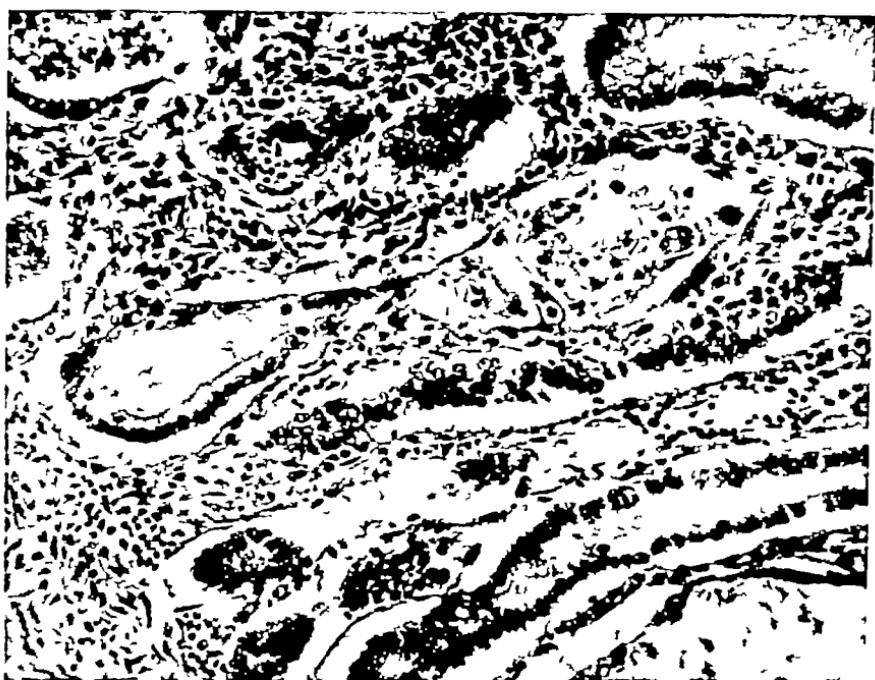
FIG 6



INTESTINE OF PELLAGRA

In center cross section of gland showing hyalinized epithelium. Above cystic gland with flattened epithelium. Photomicrograph  $\times 400$

FIG 7



INTESTINE OF PELLAGRA

Hyalinization of epithelium of neck of gland retention of cell debris and beginning cystic distention. Photomicrograph  $\times 355$

vessels, most marked in the submucosa, has been a prominent feature and this has occurred out of proportion to the arteriosclerosis of small vessels in other organs, where such a pathological change is more apt to appear in conspicuous form. Cases of pellagra in adults in whom there existed a mild grade of arteriosclerosis, of larger vessel distribution, with minor blood-vessel disease in such organs as the kidney and spleen, have shown an extraordinary arteriolar sclerosis of the submucosa of the colon. This state has been so prominent in some cases as to give rise to the question whether intestinal arteriosclerosis might have been the basis of development of the disease.

Another interesting feature of the pronounced colitis has been the involvement of the nerve ganglia of the wall in the inflammatory process. Nerve centers in the muscular coats and submucosa have shown, apparently, degeneration of the ganglia with infiltration of the groups of nerve-cells by mononuclear round cells. Apparent atrophy of these ganglia takes place in the older lesions.

The significance of these changes in the intrinsic nervous system of the colon makes for some interesting speculation. They appear to be only a part of the colonic inflammation but one naturally takes into consideration the possibility of a more direct effect of the disease on these nerve centers, in view of the central nervous system disturbances which form a part of the disease complex, and, also, the part which the effect of the disease on the peripheral nerves may play in the characteristic dermatitis.

One is also stimulated to interest in the relationship of these changes in the intrinsic nervous apparatus of the colon to the intestinal dysfunction, which is one of the clinical characteristics of pellagra. Diarrhea is a prominent condition in acute pellagra while a sluggish colon is common in long-standing cases, even at times when there is active colitis. It is perhaps not unreasonable to suspect a state of active neuritis as a factor in the former, while atrophy of the nerve centers may contribute to the latter.

The changes which have been observed in the blood-vessels and nerve centers of the intestine in pellagra merit further attention.

On account of the recognition of a rather characteristic colitis of pellagra considerable attention has been paid to the possibility of a specific microorganism as the causative factor. It has been re-

ported that *Endameba coli* and *Trichomonas hominis* were found in about 50 per cent of cases of pellagra, while *Blastocystis* and yeasts were prominent in all. No known pathogenic agent has been discovered in the faeces of those examined and there is no evidence of protozoan invasion of the tissues of the colonic wall. The state of the colon is favorable to the development of the organisms found.

The existence of even a characteristic inflammatory lesion does not, of course, necessitate the participation of a specific organism in its production, nor is it inconsistent with the common conception of the disease as a dietary deficiency of some unknown or imperfectly known food factor.

In fact, the peculiar epithelial change in the gland crypts may be brought into comparison with the replacement of various glandular epithelia by keratinizing stratified squamous epithelium in experimental fat-soluble vitamin A deprivation, as reported by Wolbach and Howe.<sup>2,3</sup> In that condition, however, there is apparently a definite epithelial metaplasia, and the intestine epithelium is not affected, while in pellagra no other glandular epithelium has been observed to be affected thus far and the change does not appear to be a definite metaplasia.

The state of the intestine described is the outstanding structural change in pellagra. It constitutes thus far the only visible characteristic evidence of the disease, except the dermatitis, at postmortem examination.

It is considered possible to make a postmortem diagnosis of pellagra upon it, even when the clinical state has been somewhat doubtful or has been unknown, and even in the absence of a typical dermatitis. It is probably an important part of the pathology of the disease and is, at least, a prominent pathological feature (Figs 1-7).

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## FORTY-FIVE YEARS OF PERSONAL EXPERIENCE WITH HEADACHE

By JAMES J WALSH, M.D., Ph.D  
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HEADACHE is such a vague term and as a symptom-complex is due to so many causes for which so many different modes of treatment have been recommended that it may be worth while to record an individual experience of a physician lasting about forty-five years with periodical headache, the cause of which has been gradually worked out and the treatment for which has been empirically developed until, while the headache continues to be disturbing when present, it can be overcome and work can be continued and sleep secured. During some thirty years of practice as a physician I have found a number of cases of headache, especially in men, which proved to be due to the same cause and which were treated successfully by the same method. For the sake of the clinical value of the observation and its significance very probably for a great many other patients, it has seemed worth while to record the details especially now that the lapse of time has made it perfectly clear that the headache is merely a functional disturbance and has no connection with any organic lesion or any serious disturbance of systemic function, but is due to a very simple cause which undoubtedly is active in a great many other people.

The headache itself when untreated is accompanied by so much discomfort rising to a climax of severe pain intolerable without some mode of relief, that it would seem surely to be connected with some grave affection either of the central nervous system or of the metabolic functions. Over and over again physician friends have been persuaded that it must be due to some serious organic condition that would sooner or later reveal itself by more outspoken symptoms.

The headache was first noticed at the age of about twenty while the patient was studying very hard and taking comparatively little exercise. The attacks consisted of pain, gradually growing deeper in intensity, localized over the vertex with a sense of throbbing

there, and both pain and throbbing became much worse on lying down. It would usually come on about the middle of the afternoon, not prove very disturbing until the later part of the evening, become almost unbearable about ten o'clock and then continue until sleep was obtained. Sleep could be obtained only by sitting propped up with a number of pillows with the head as erect as possible. After two or three hours sleep would come a little fitfully at first because the pain within the skull would keep on finding its way into the dreams and wake the patient up. After two or three hours of sleep, however, the pain would pass and by the next day there would be a somewhat numb feeling in the head but it would be perfectly possible to go on with study and the headache never came on two nights in succession though sometimes it would recur at the end of a week, but oftener there was from three to six weeks' interval and the intervals were not regular. Almost needless to say, the incident was very disturbing. The pain was extremely severe and any attempt to lie down made it so much worse that it was quite impossible to continue in the lying position. Before a mode of treatment was found to relieve it, the headache was very disturbing.

A number of physicians were consulted and an almost equal number of causes suggested for the condition. Most of them were very generic. The patient in his younger years had been on all the teams when at college. He had played hard at baseball and football, he had been an excellent hockey player and a good handball player, so that for some seven years of preparatory school and college work he had gone through hard exercise for at least three hours every day. He was now without exercise except for quiet walking and an occasional game of handball or a still more occasional game of baseball. His headache was considered to be due to lack of outlet for end-products of metabolism such as had been provided by the hard muscular exercises through which he had gone. The old-fashioned country physician who saw him was a rather scholarly man of the old school who suggested that the headaches were probably gouty in character or at least of similar nature and supposed to be due to an accumulation of uric acid in the blood. When that reached a certain stage of concentration, the headache developed as a sort of explosion and it was considered that in some way nature got rid of "the peccant material," the old

doctor's expression, and then after a period of sleep the patient began another interval during which there would be an accumulation of pathological materials in the circulation, once more reaching a climax after three to five weeks and then producing another serious attack of headache.

The old gentleman recommended opium by mouth and when taken in sufficient doses this proved to give relief though the patient was sleepy and seriously disturbed at his work the next day and usually required a laxative to relieve him of the dull feelings that followed the opium. The headaches continued to recur in spite of a course of Epsom salts taken about once a week with the idea of draining the system of the gradually accumulating pathological material. No relief was afforded by this during the course of several years.

At the end of that time the patient became a medical student and his headaches continued to recur. By this time he was ready to experiment upon himself and he found that antikamnia in the form in which it was originally put on the market when taken to the extent of about ten grains would relieve his headache and not prove nearly so disturbing to the system as the opium. Further it was found that a hot foot bath would help to relieve the headache to a considerable extent and above all would enable the patient to get sleep much more readily than before and do away with the necessity of using quite so much antikamnia. Consultation with a physician brought the diagnosis that the headache was congestive and that as there was a missed heartbeat probably these two conditions, the neurotic heart and the congestive headache, had something in common. At that time the uric acid diathesis as a causative factor in rheumatic and related diseases was going out and bacterial causes for these diseases were being looked for. There seemed to be no bacteria in this case, so it was concluded that the defective action of the heart brought about occasionally a tendency to overaction and this caused the headache. The periodicity of the headaches is not explained in this theory except in so far as it was thought that at times there was a systemic call for blood by the brain in the midst of the rather hard mental work to which the patient was giving himself, and this was on occasion exaggerated and therefore produced the painful reaction. In those days, forty

years ago or nearly, it was not realized generally that the brain tissues themselves are not sensitive and that whatever of pain is associated with headache is due to meningeal irritation or at times perhaps, as in this case, to meningeal congestion.

The patient was recommended to moderate his studious habits, to get out in the air more, to secure diversion of mind and though the headache still continued to recur only at intervals of from three to five weeks there was some question whether the patient would be able to stand the strain of hard study and he faced the possibility of having to give it up at least so far as the physician he consulted was in question.

Later the patient consulted a neurologist, about the time when there was considerable discussion of migraine as a sort of equivalent for epilepsy. Some of the French neurologists had suggested the possibility that it represented a form of sensory epilepsy and as this headache was intensely painful and occurred at intervals, though not at regular intervals, the suggestion was that the condition must probably be considered a form of sensory epilepsy. This was not very consoling but as there had never been any tendency for the attacks to occur at shorter intervals, and sometimes without any treatment there would be several months between attacks, it did not seem worth while bothering very much about.

About that time several physicians were inclined to diagnose the condition as a sort of explosion in the nervous system due to an accumulation of irritation which finally led up to the discharge of sensory nerve impulses that produced the headache. This was somewhat along the line of the migraineous character of the headache, and its relation to sensory epilepsy though those terms were not used in the new diagnosis. Instead of having any organic elements in it or organic etiology, the headache was diagnosed as functional in character and probably due to worry and anxiety as well as hard mental work though the patient did not consider himself much of a worrier and he had so many interests that there was very definite diversion of mind.

After a while the patient began to realize, after becoming a physician himself, that there was a definite connection between his eating and the occurrence of the headache. It came on whenever there was a much longer interval than usual between meals.

He noticed this fact first in connection with formal dinners or banquets many of which he attended because he was asked to make addresses at them. If the dinner was announced for seven o'clock but the guests were not seated until half-past eight and if service was slow at the beginning so that little was eaten before nine o'clock, he would surely be awakened by a headache in the morning. At first he attributed that to the taking of wine before the Volstead Act and the Eighteenth Amendment, or the taking of coffee. Abstention from these, however, still left him with a definite tendency to have the headache recur if there had been a long delay before the meal began.

Next he noticed it with regard to breakfast in the morning. If that was delayed for several hours after he got up, he would inevitably have a headache four or five hours later beginning in the afternoon and lasting until he got to sleep that evening unless some definite treatment were secured for it.

In the course of his observations he noticed that whenever there was a prolonged delay between meals he would quite surely have at least some symptoms of the headache and usually these went on to the full development of it unless it were prevented by anodynes. He noticed that his headache came particularly on Friday if there was any irregularity of the meals. He does not eat meat on Friday, cares very little for fish or eggs, and as a result always feels a little less capable of work on Fridays than on other days. It is particularly when no meat is eaten during the day that any delay in meals is quite sure to be followed by headache. He watched the condition for years and came to realize that this explanation was complete and that the headache was due to some disturbance of circulation consequent upon the fact that a meal was not taken at the usual time. Whether it was, that, as was suggested by some of the specialists in stomachic affections whom he consulted, the lack of any occupation for the blood in the gastro-intestinal tract because digestion was not going on led to the congestion in the blood-vessels of the meninges or some other reflex action, was not very clear. Here was the cause, however, and with a little care the interval between the headaches was lengthened to eight weeks or longer though they still continued to recur occasionally because it was quite impossible to be absolutely assured of meals at regular intervals and then besides after a pro-

longed interval without headache the necessity for special care with regard to the meals was forgotten and the headache came on as the result of the neglect of precautions

During his practice as a physician the patient found that there were a number of Catholic priests who always suffered very severely from headache if they had to say a late Mass. I may say for the sake of those who are not familiar with Church practices that Masses are said as late as eleven or even half-past eleven and sometimes even after twelve o'clock, and the celebrant of the Mass has to be fasting from the midnight before. If he goes to bed about twelve o'clock or a little before and rises at seven or eight, he will then have to wait four or five hours before he gets his breakfast. Most men stand this abstinence from food very well, but a certain number of them regularly develop headaches on Sunday afternoon that are very severe and that require rather powerful medication to relieve them. I had a very dear friend, a bishop, who all his life suffered from headaches whenever he had to delay his breakfast beyond an hour or two after getting up. As a result his clerical obligations were a source of such discomforts as made Sunday a day of misery.

For those who were thus affected it was found that a scheme of eating could be worked out that would enable them to avoid having the long interval before their breakfast in the morning. Priests who were to say the late Masses were counselled to have a sandwich and a glass of milk or a cup of tea—or coffee if they were not especially susceptible to it—shortly before midnight. If they were at all under weight, they were counselled to take a rather good meal just before twelve. They were then to stay up for two or three hours studying or preparing their sermon for the next day or reading, and then were to go to bed and get up as late as possible in the morning so as not to have a long interval of fasting just before Mass. I have had a series of priests who have benefited very much by this change in the program of eating for Saturday night and Sunday morning when they have to say the late Mass. The great majority of them are not disturbed at all by the abstinence but those who suffer so severely as to make a change of this kind well worth while. It usually does away with the tendency for the

headache to recur regularly on Sundays and make the day very miserable

The patient found that it was not necessary to have a full meal at the regular time to eliminate the tendency to headache. If even a glass of milk and a couple of crackers were taken at the usual hour for the meal and then the meal itself taken an hour or two later, the headache would not develop. Apparently the occupation of the stomach with food was sufficient of itself to prevent the congestion within the skull which brought about the headache. It was important, however, to have fluids at this preliminary lunch. A sandwich or some crackers and cheese without a cup of tea or a glass of milk or a couple of glasses of water would not suffice to prevent the headache or at least would not prevent it completely. A luncheon consisting of sandwiches without fluids did not suffice even though taken at the regular time to prevent the occurrence of the headache. There had to be something like a regular meal though not necessarily a heavy meal. A small piece of meat seemed to be particularly effective in preventing the occurrence of the headache provided it were eaten with certain other things. Fruit alone, raw or cooked, was not sufficient as a rule to prevent the recurrence of the headache if taken at the regular hour when it was known that there would be a delay in getting the next meal, though even an apple or an orange eaten in the interval would prevent the headache from being quite so bad as it otherwise would be.

The best treatment for the headache was found to be the coal tars. Antikamnia proved efficient and was, I believe, a compound of certain coal tars with a heart stimulant. While studying in Germany the patient found that pyramidon, which had recently been put on the market, proved very efficient in relieving the pain and giving an opportunity for sleep. In the course of time, however, he settled down to the use of what is known as migraine tablets. These consist of two grains of acetanilid, one-half grain of monobromate of camphor, and half a grain of caffeine citrate. For more than thirty years now the patient has never left home without having some of these tablets in his pocket. They are always kept in the house. He weighs nearly two hundred and fifty pounds so he considers that he can take a good-sized dose. Most of h ^ wei ^

is not fat but rather solid muscle accumulated during years of devotion to athletics. He usually takes three tablets, that is six grains of acetanilid, and then at the end of an hour takes another three tablets, six grains more, and usually the headache is alleviated so completely that he can go on with his work. Sometimes two or three further tablets are taken if there is any tendency to exacerbation of the remains of the headache when he lies down at night, but this is very rare.

The story of the patient's life in relation to his headache seems worth while telling because from his own experience and that of some of his patients there is no doubt that a great many people suffer from congestive headaches and probably owe their condition to the simple causation that they are taking meals irregularly. When this is found to be the cause of the headache, it clears up the situation very much and makes the patient feel encouragement over the thought that there is no serious organic affection at work. Prevention becomes a reasonably easy matter after a time, especially for those who are at home most of the time. Undoubtedly in the older days many a headache attributed to train sickness or something of the like was really due to the irregularity of meals caused by the exigencies of railroad travel and the delays experienced from various causes. As more and more diners are used on the railroads instead of the eating stations or the station restaurants of the older time, the prevention of the headache becomes much easier.

Patients are greatly relieved to find that the cause is so insignificant. They are almost sure to have consulted physicians who either suggested migraine or perhaps even mentioned the possibility of the relationship between migraine and epilepsy so that they have been made solicitous about the condition and have been very much inclined to think that it would continue to get worse and probably more frequent until life would be made very miserable by it. After all it is dreads of this kind that make many pathological conditions or even symptom-complexes seem much worse than they really are. The dreads and anxieties of mankind are often harder to bear than their actual ills.

The fact that the patient has had his headache now off and on for forty-five years makes it very clear that there is no serious pathologic condition at work. He has never had more than a trace

of albumin in his urine and that only at intervals and usually after he had been taking pretty large doses of acetanilid. There have never been any casts in his urine. His blood-pressure has been normal but rather low for his age than high. For the past ten years it has never been above 140 and has usually been slightly below 130 systolic pressure with about 80 as diastolic pressure. He has had no disturbance of sleep except occasional insomnia after the taking of coffee to which he is very sensitive. There is a definite tendency on cold days to frequency of urination but on damp days this usually is accompanied by an increase in the amount of urine passed but of low specific gravity. There is no association, however, traceable between the headaches and this relief of pressure within the body by the passage of straw-colored urine of low specific gravity.

sleep and when sleep was obtained the headache would usually disappear. To be effective, however, the foot bath had to be as hot as could be borne and the feet had to be kept in it for at least fifteen minutes. There was a little tendency for shiveriness to occur unless the upper part of the body were well wrapped up. Manifestly the opening of the capillaries in the feet and legs half way to the knees kept enough blood down in the extremities to lessen the blood-pressure within the cranium. The headache was undoubtedly congestive in character, worse on lying down, and this might have been expected. When the effective use of the coal tar remedies for relief of the headache was worked out, the hot foot bath was no longer used mainly because of the work connected with its preparation though on a few occasions when headache tablets were not at hand the hot foot bath proved an excellent resource when otherwise the pain would have been almost unbearable.

At various times all the causes of headache were evoked as the etiology of the affection. An eye specialist friend, the late Doctor Gould, who was quite sure that many of the afflictions of mankind come from eye-strain, was convinced that there was some definite connection between the headache and the eyes. He thought it was a question of muscle imbalance and of course he has pointed out in his series of biographic clinics that a great many of the literary lights of Europe were sufferers from rather severe symptomatic conditions which he attributes to eye-strain. At the beginning of the affection, it was thought that there was a certain amount of astigmatism and glasses for its correction, though it was but of a very slight degree, were provided. At the time when they were prescribed, the patient had just lost some forty pounds and on regaining his weight there seemed to be no more need for the glasses. In the meantime, the headaches continued to recur whenever there was irregularity in eating. The fitting with glasses did not prevent the recurrence of headache nor did the taking up of glasses for regular wear at the age of forty-two have any effect upon the recurrences of the headache at more or less prolonged intervals.

As time went on each of the new fads among the physicians and the specialists was appealed to as regards its causation and cure. When the removal of tonsils became a very common practice

because of pains and aches of various kinds supposed in some way to be connected with them, rheumatic or arthritic conditions due to absorption of toxins from fear of infection, the removal of the patient's tonsils was suggested. One well-known clinician, who was quite sure that most of the pains and aches of mankind represent rheumatic conditions, felt that there was a rheumatic irritation at least of the meninges of the brain because of the absorption of toxic material from the tonsils. The patient has somewhat enlarged tonsils and this specialist insisted on their removal. The patient was, however, so confident himself that the headache was due to a disturbance of the regularity of eating, that he refused to have the tonsils removed until other symptoms would develop that might determine the problem. The specialist warned that the continued irritation of the meninges might already have led to changes in them which would make relief through the removal of the tonsils impossible because though this would prevent further absorption of toxic materials, the changes induced by what had been absorbed before might continue to be a source of decided achiness within the skull. The tonsils were said to be rheumatic and the presumed change in the meninges of the same character.

Of course when the question of focus infection in connection with the teeth came up, some of the patient's doctor friends were inclined to think that this might be the cause of the headaches. Very few of them were ready to accept the very simple idea that a disturbance in the regularity of meals brought about the condition. They all looked for something much more complex and when the teeth as sources of infection were on the carpet, the headaches were attributed to them. Rather careful examination of the teeth, however, failed to reveal any serious pathologic condition. Some of the teeth had been filled and there were some signs of irritation along their roots, but nothing that would indicate the presence of an abscess and no pathologic change from which it might be expected that absorption of toxic material would be taking place. Gradually between forty and sixty-five the patient lost all of his upper and many of his lower teeth but this made no difference as regards the occurrence of the headaches. They came at irregular intervals and could always be connected with disturbances of the program of eating during the day.

It has seemed worth while to mention these various diagnostics in etiology, each of them depending on the popular medical interest of the moment, because it is evident that under ordinary circumstances the patient would have been subjected in succession to the treatment supposed to be efficient in connection with the theoretic diagnosis that had been reached. Any change for the better, any lengthening of the intervals between the attacks due to a little more care with regard to eating would surely have been attributed to the latest medical or surgical fad that was attracting attention. Fortunately the patient was strong-willed enough not to let himself be carried into any of these and so he has continued to be a very interesting subject for the proposed application of all of them.

Of late years some of his medical friends who know of his recurring headaches have been urging him to try the effect of high colonic irrigation. They are quite sure that his headache is toxic in origin and due to auto-intoxication, that is to the absorption of toxic materials of various kinds from the large intestine when there is any delay in the passage. The patient has never, however, had any tendency to constipation, and on the contrary in recent years has usually had two or even three stools a day. He refused the colonic irrigations then and also refused to use mineral oil with the idea that toxic material might be carried out in that way.

He still continues to have his headaches though sometimes it will be two or three months between the attacks, and he might have had most of his teeth removed as well as his tonsils and he might have had various therapeutic manipulations of his intestinal tract. Years ago when the stomach tube first came in it was proposed that he should have his stomach washed out at regular intervals in anticipation of the headache. Washing of the stomach at that time was considered to be of a good deal of importance in the elimination of the various toxic substances which had formed as the result of the delay, real or supposed, of food in the gastro-intestinal tract. Indeed what was called the toilet of the stomach in those days or as the medical students termed it, the laundry of the gastro-intestinal tract, was supposed to be efficacious in curing a great many symptoms not necessarily bearing any intimate relation to the gastro-intestinal tract.

The patient was saved a great many rather bothersome manipu-

lations by refusing the treatments but his headache continues though he has the satisfaction of knowing he can now relieve it so completely that it does not interfere with his work and that he gets to sleep without difficulty and will have no more trouble from it for some weeks at least and sometimes for several months.

The clinical history seems worth while to put on record because it has extended over so long a period and because so many different causes have been suggested for it. It is very probable that a great many of the headaches which occur among students and teachers are of this character. Instead of looking for recondite possibilities of etiology, it would be well to take these cases at first from this standpoint and treat them simply as functional disturbances consequent upon lapses of habit in the matter of eating or failure to realize that the stomach expects to be occupied at regular intervals and if it is not may disturb the circulation to more important organs. If that seems too simple and old-fashioned an explanation, it must not be forgotten that it has stood the course of time and that at the end of over forty years no other explanation has been suggested which seems so worthy of acceptance. If some of the patients who complain bitterly of headache could be cured as simply as this one or at least greatly relieved so that it is quite possible for them to go on with their work, that would be a consolation devoutly to be wished and this attitude will greatly relieve the minds of people who are inclined to be worried over the fact that a headache may mean that some serious organic disturbance is at the basis of the recurring set of symptoms.

# Medicine

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## HEREDITARY EPISTAXIS; WITH AND WITHOUT HEREDITARY (FAMILIAL) MULTIPLE HEMORRHAGIC TELANGIECTASIA (OSLER'S DISEASE)

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NOSEBLEED, or epistaxis (Nasenbluten), has been an important subject for discussion since Biblical times. It was one of the earliest complaints treated by medical men and healers.

In the study of the subject of "Epistaxis," I have reviewed the medical literature for the past three hundred years, but, especially, the reports published since 1830 (Figs. 1-8).

Hippocrates (450 B.C.-357 B.C.), in *Epidem Lib I Aphor 33*, spoke of vicarious menstruation (rhinorrhagia) through nosebleed. Hippocrates remarks that those who have confirmed nosebleed into a habit are young persons apt to incur diseases of the chest, pleuritis, pneumonitis, hemoptysis and consumption, probably owing to a metastasis of the nasal irritation to the lungs. But such not taking place, it is held to have a contrary effect, or preventive of pulmonary affections.

Nasal hemorrhages may be very profuse. Thus Johannes Rhodius (1587-1659), of Padua, in his "Observationum Anatomico-Medicarum Centuriae Tres" [1657, I b, also Frankf (1676)], mentions a case losing eighteen pounds of blood within thirty-six hours. Bartholin's patient lost forty-eight pounds, and a writer in the *Leipsic Acta Erudita* mentions a patient losing seventy-five pounds within ten days.

The *Ephemera of Natural Curiosities* contain a case report in which the patient bled from the nose without cessation for six weeks. In 1820, Professor Chapman treated an elderly gentleman who lost

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several quarts of blood and mentions two cases who bled to death Claudius Galen (131-200 A D), Fabricius Hildanus (1560-1634?), Coschwitz (1616), J Rhodius (1587-1659), Henricus Petraeus (1589-1620), Rumpler (1615), Fredericus Hoffmann (1718-1740), Sebiziis (1630), Kau (Jena, 1710), Block (Jena, 1679), Taunton (1830), Sutton (1864), Babington (1865), Albert Rosenberg (Berlin-Vienna, 1900), and others too numerous to mention, have discussed nosebleed, or epistaxis, associated with various diseases and different constitutions, and often leading to fatal results

Thus, Albert Rosenberg, of Berlin, in *Handbuch Der Laryngologie und Rhinologie*, Vol 3, 2 Halfte, by Professor Paul Heymann, pp 697-722, Vienna, 1900, writes on "Das Nasenbluten," giving 369 references to the literature on the subject from Hippocrates, 400 B C, to Hastings, December, 1897. Fredericus Hoffmann (1740) long ago remarked that persons with frequent and profuse epistaxis, when young, had a peculiar constitution like that observed in "bleeders" and also similarly discussed by Laycock in *Medical Times*, p 501, London, May 17, 1862. Hoffmann observes "observamus porro, omnes fere' eos, quibus sanguis copiosus et frequentius in primis annis per nares erumpit, natura valde' imbecilles, animo quoque sensibiliiores, variisque morborum afflictionibus, spasmis et doloribus per omnem fere' aetatem subjectos esse, rarius etiam vitam diu protrahere, quippe in juventute in phthisin inclinent, in consistente aetate in malum flatulento-spasmodicum sive hypochondriacum facile incident, atque aetate proiectiori ad dolores nephriticos et podagricos multum proclives sunt" (HOFFMANN "Medic rational systemat," Pars II Sect I, Cap I u *Opusc physiocomedica*, p 196, 1740.)

Thomas Laycock, of London (1862), in his lectures on "The Hemorrhagic Diathesis and Hemoptysis," says, "epistaxis is a symptom of considerable significance, although generally overlooked in persons of phthisical habits." He has often noted it as being premonitory of future hemoptysis, and often, too, observed it as coinciding with intercurrent attacks. In many of his 227 cases of diathetic "bleeders," it was noted that the bleeding was nasal (about one-half of the cases) and he found that epistaxis, hemoptysis, hematuria, and hematemesis succeeded or alternated with each other or were "metastatic." He emphasized the fact that epistaxis, repeated and profuse

attacks about puberty in certain constitutions *do* indicate a tendency to hemoptysis and tuberculosis subsequently

Laycock, Chapman (1839), Sutton (1864), and others believe there was a class of cases in which the hemoptysis and the nosebleed recur from time to time rather as a hereditary or a rheumatic than a tuberculous affection, the condition being a "constitutional epistaxis" or "hemoptysis" Laycock (1862) further speaks of mitral constriction as a source of hemoptysis and epistaxis and their close relation to rheumatism He emphasized the hereditary relationship of nosebleed and blood-spitting He concludes by saying that the hemorrhagic diathesis presents many of the peculiarities of the rheumatic or gouty, whether we regard the age, sex, hereditariness, tendency to articular affections, or the exciting causes of the periodic or paroxysmal bleedings

Hoffmann (1740), Taunton (1830), Chapman (1839), Babington (1865), Rosenberg (1900), Frohlich (1891) and many of the other older writers recognized the importance of heredity in relation to repeated and habitual nosebleed It has also been emphasized that attacks of nosebleed frequently precede attacks of acute rheumatic fever

Professor Chapman, who was Professor of Physics, University of Pennsylvania, prefers the term "hemorrhagia nasi" to "epistaxis" (*Medical Examiner*, vol 2, No 8, pp 117-118, Philadelphia, February 23, 1839) Rosenberg (1900) prefers the term "hemorrhagia narum" or "rhinorrhagia" Chapman says (January 5, 1839) that those with short neck and large head are prone to have epistaxis or apoplexy, while those with narrow, ill-shaped chests are equally subject to hemoptysis Nor is it uncommon for *whole families* to be thus distinguished, and who, in some instances, seem to derive the peculiarity by inheritance He refers to instances reported in Andral's work on Pathological Anatomy, and in an essay on the subject by Dr Reynell Coates, in the *North American Medical Journal* He mentions the writings of Morgagni, Bichat (*Anatomie Generale*), and Marendel

Marendel found no ruptured blood-vessels in these fatal cases of vital (spontaneous) hemorrhages even with the microscope Chapman speaks of "the dermoid usually effuses in the shape of petechiae or vibices, or what is called hemorrhæa purpurea" Aristotle,

Theophrastus, Lucan, and Huxham speak of these hemorrhagic "spots" I am of the opinion that these old writers saw cases of epistaxis with telangiectatic skin and mucous membrane lesions

C Hanfield Jones (*Medical Examiner*, London, vol 1, Nos 46 and 47, pp 806, 823, November 16 and 23, 1876), in his "Clinical Lectures on Epistaxis," does not mention telangiectasia and familial epistaxis He says, however, that "in these hemorrhages, the deterioration of the capillaries seems to be the essential morbid change"

Valsalva knew that nosebleed occurred more often from the anterior portion of the septum (das knorpeligen Septums) He also knew that "sanguifera vasa intra nares valde turgida circa eam sedem, ubi alae nasi digito plus minus transverso ab imis naribus cum osse committuntur "

Doctor Marvin, of Geneva (*Journ de med et de Chirurg Pratique*, 1872), stated that as blood in epistaxis generally came from only one nostril, and most frequently from the anterior third of one of the nasal fossae, he was led to believe that by compressing the corresponding facial artery on the superior maxillary bone near the ala of the nose, the afflux of blood would be diminished and the hemorrhage at once arrested

Doctor Brunner (*Hufeland's Journal*) stopped epistaxis by blowing powdered gum arabic through a quill into the nose In the *Philadelphia Monthly Jour of Med and Surgery*, vol 1, No 2, p 102, July, 1827, a case is reported of a young man, aged nineteen years, who continued to bleed until stopped by this method

Fabricius (Guilhelmus) Hildanus (1682), in his *Op observ et curat med chir*, reported a young married man who had severe nosebleed after each coitus

J Rhodius mentioned nosebleed following smelling a rose

T A Hall (*Virginia Medical Monthly*, 1896) says the powder of fungus myces (F), commonly known as "devil's snuff," has invariably stopped epistaxis when snuffed up the nostrils

In "Epidemics," Liber I, in the Third Constitution, Par VIII, Sec 2, Hippocrates speaks of epistaxis as one of the four modes by which ardent fevers (or causi) came to a crisis When, in these attacks of ardent fevers there was a proper and copius hemorrhage from the nose, they were generally saved by it, and "I do not know a single person who had a proper hemorrhage who died in this

constitution " The hemorrhages attacked most persons, but especially young persons and those in the prime of life, and the greater part of those who had not the hemorrhage died. In certain individuals, he says, both the hemorrhage from the nose and the menses appeared at the same time

Winstead (1858) stopped severe nosebleed by cold, wet applications to the scrotum

Rosenberg (1900) in his paper says Hoffmann recognized the importance of heredity in cases of nosebleed. He mentions a case of epistaxis in a child, whose father and four brothers suffered from epistaxis. Among 27,000 patients of the University Poliklinik for Throat and Nose Diseases (Berlin), he found 367 instances of nosebleed, of which 247 were in males and 120 in women. The largest number occurred in the period of puberty, 101 were between fifteen and twenty years of age. He mentions a case of a young girl, aged fifteen years, who had not menstruated normally, but who bled irregularly from the nose, and a woman who missed her periods for five or six months without pregnancy, and who suffered from epistaxis for six weeks when she was seen by Rosenberg. He found nosebleed to vary with climate and seasons, the largest percentage of cases occurring in May, June and July.

Obermeier mentions an interesting case in a young man who bled from the nose every month for 3 days since the age of 15 years

Rosenberg mentions severe nosebleed at times after postoperative menopause

Hubbard reports a pregnant woman who died from profuse nosebleed

Urbantschitsch, Taubert and Blondeau noted pregnant woman who aborted after nosebleed

Blondeau (*Gaz des Hop* nr, vol 149, p 51, 1874) recorded a case of a pregnant woman who aborted following blood transfusion for epistaxis

Under the term nosebleed, or epistaxis (Nasenbluten), as used in this paper, I include bleeding from the nose, the source of which is to be found in the nose. Bleeding from the nose, as may occur in hematemesis, hemoptysis, postoperative (tonsillectomy and adenoidectomy) conditions, vegetative adenoids, ulcerations and new growths of the naso-pharynx, middle-ear bleeding, fracture of the base of the

skull, etc., are not included. Nor am I considering the numerous other *causes of nosebleed* as may occur in leukemia, purpura, hemophilia, the anemias, cirrhosis of the liver, cardiac decompensation, valvular disease (mitral stenosis, etc.), nephritis, uremia, hypertension, arteriosclerosis, sunstroke, vicarious menstruation, coitus, scorbatus and other deficiency diseases, masturbation (Peyer, 1889), hypertensive heart disease (with left ventricular hypertrophy), essential hyperpiesia, amyloidosis (amyloid degeneration of the liver and kidneys), acute endocarditis, rheumatism, typhoid fever, influenza, pneumonia, relapsing fever (Tennent, 1871), malaria, pyemia, septicemia, morbus maculosus Werlhofii, variola, erysipelas, typhus fever, psittacosis, scarlatina, diphtheria, whooping cough, syphilis, morbilli, Voltolini's and Hajek's perforating ulcers, angiomatous polyps of the septum, malignant tumors, foreign bodies, parasites, worms, benign new growths, high elevations, trauma, and (finger) picking of the nose.

I limit myself in this paper to a discussion of a definite clinical entity, namely, cases of hereditary (familial) nosebleed occurring in families and often associated with telangiectatic lesions of the skin and mucous membranes. Other types of bleeding in members of such families have been reported during the past fifty years.

The hemorrhages in some of these cases may not only occur from the nose but also from the stomach (Osler, 1907, Weber, Hale White, Hutchinson and Oliver, and Barford, January, 1926), the bowel (T C Fox, 1908, Harper, 1929), the kidneys and bladder, the lips, the tongue (Goldstein, 1921, Harper, 1929), the bronchial tree, and the cerebral vessels as reported by Archer (1927) and as occurred in the patient I reported in 1921, giving rise to an attack of apoplexy with hemiplegia. Mekie (1927) mentions an affected cousin of his patient's who died at twenty-eight from a ruptured vessel in the brain.

Cases of nosebleed in several members of a family may occur, without a definite history of the presence of telangiectasia. However, in some instances, as was well shown by Fitz-Hugh (1923), other members may be thus affected (with skin lesions) in future generations. He believes an atavistic tendency in this condition has been demonstrated. He has noticed atavistic skipping of a generation in seven cases. Foggie's family shows this atavistic tendency.

Gossage believes that in some of these families many of the children die young, before an opportunity has been afforded to know whether they would also have been similarly affected, which accounts for fewer affected ones. He says "the condition of multiple hereditary telangiectasis seems also to be a dominant to the normal condition."

Henle believes the condition acts as a simple dominant with some variations.

It is also true, I believe, that cases of familial hematuria (Apert, 1907, Fogge, 1928, Attlee, 1901, Pearson, 1904, Aitken, 1909, Guthrie, 1902, Hurst, 1923, and Granddier), familial hemoptysis (Libman and Ottenberg, December, 1923, and Mantchik, 1922), familial hemorrhagic nephritis (Hurst, 1923), and hereditary hemorrhagic telangiectasia, with or without familial epistaxis, are all properly classified under the same heading.

H. G. Sutton, Assistant Physician to the Metropolitan Free Hospital, in the December, 1864, issue of the *Medical Mirror* (pp 769-781) in a thorough manner discusses "Epistaxis as an Indication of Impaired Nutrition, and of Degeneration of the Vascular System." He emphasizes the important part played by imperfect nutrition and degeneration of the vascular (capillary) system. He discusses the well-known fact that those that bleed habitually from the nose are more liable to certain diseases than others. Thus, he shows that it frequently occurs in individuals subject to rheumatic fever, hemoptysis and phthisis in adult life.

J. J. Kamm (1745) in "De haemorrhagiae narium in junioribus nimiae noxis" (Argentorati), also observed that there is a connection between the epistaxis of youth and the hemoptysis and phthisis of adult life.

J. Haan, 220 years ago in "De haemorrhagia narum" (Argentorati, 1701), reported similar experiences.

Laycock (1862) stated that he has often noted epistaxis as being premonitory of future hemoptysis.

French, in his "De Curandis Hominum Morbis," stated that "young people who had been subject to oft-repeated nasal hemorrhage have to fear hemoptysis, and that hemoptysis is hereditary in some families, and those liable to it may succumb in the flower of their age to this hemorrhage or to consumption."

Chomel has stated in his essays on rheumatic fever that Hippocrates said, in the end of the second volume of *Prorrheton*, that those who had been subject to epistaxis in their childhood and youth are particularly predisposed to arthritic fevers. Chomel found that one-third of those who had rheumatic fever had previously suffered with nosebleed.

Sutton (1864), too, has found that of thirty-one patients suffering from rheumatic fever, twenty-one had had epistaxis. There are patients who have previously suffered from rheumatic fever who later have repeated attacks of epistaxis. He reports a case of a lady, aged seventy-four years, who had severe attacks of hemoptysis, and bled profusely from the nose when a young girl. He reports a case of a woman, aged forty-six years, who bled from the nose when a child, and now was suffering from hemoptysis. Her father suffered from a "ruptured blood-vessel of the lungs" and hemoptysis. An only brother, who died of inflammation of the lungs, also had hemoptysis and, for a number of years before her brother died, he often bled profusely from the nose. Her three sons all bled from the nose. An only daughter, aged twenty-eight years, had never had attacks of epistaxis.

Sutton reports a second family in which there were three brothers who had nosebleed. One brother, who died at thirty-one years of age, bled profusely from the nose, for many years, before he began to spit up blood ("pints"). Another brother, who had suffered from epistaxis, was later laid up with rheumatic fever.

Sutton says that epistaxis is hereditary in some families has been asserted by so many physicians that it would be difficult not to believe that it is so. It is important to remember that there is a connection between epistaxis of youth and rheumatic fever, and valvular disease, hemoptysis and phthisis, of adult life.

Hoffmann, also, has stated that those who suffer with frequent and copious epistaxis in early years, are often subject in youth and adult life to hemoptysis and phthisis, and in middle age to gravel and gout.

Sutton tabulates eighty-three cases of phthisis and shows that of this number fifty-two had had epistaxis at some periods of their lives. He also found that, during phthisis, epistaxis often occurred before the hemoptysis.

J C Taunton (*London Medical and Surg Jour*, Article III, vol 4, No 24, p 489, June, 1830), Surgeon to the City of London Dispensary, reported his own case of recurrent epistaxis for twenty years His parents were apparently healthy

Boenninghaus, of Breslau (1923), speaks of habitual nosebleed in patients he has seen off and on, during twenty years, bleeding from "Vena liminis" and not from "Locus Kiesselbach of the Septum" He mentions that Valsalva knew of this source of habitual nosebleed, and stopped the hemorrhage by means of finger pressure Boenninghaus stopped the bleeding point with the electric cautery or the chromic acid bead

Frohlich, of Cassel (*Der Arztliche Praktiker*, 1891), reported a young patient with recurrent severe nosebleed—a brother died from epistaxis, and his only sister bled profusely since the first menstrual period No mention is made as to the parents bleeding from the nose

Korstakow (1886) mentions a case of menstrual precox, with severe periodic epistaxis

Fricker (1844) reports fatal nosebleed of vicarious menstruation

Barford (1926) reports two cases of recurrent gastric hemorrhage without organic lesion and associated with other hemorrhages In one case there occurred recurrent severe hematemesis with occasional epistaxis and hematuria

Hurst (1923) reported sixteen individuals in three generations suffering from hereditary familial congenital hemorrhagic nephritis These cases were similar to Guthrie's (1902) series of congenital, hereditary and familial hematuria Up to 1912 Hurst could find records of only two other families similarly affected Since 1912, he says (1923), he learned of two additional families through Dr W W D Thomson, of Belfast

E Libman and Reuben Ottenberg, of New York (December 15, 1923), reported seven members of a family suffering from rather profuse hemoptyses at intervals for years, beginning at puberty or in early adult life, and not seriously impairing the general health Tuberculosis was excluded No telangiectases were seen in the upper air passages bronchoscopically No mention is made of telangiectases in any other part of the body In the cases recorded, the condition seems not to skip generations The coagulation time was

normal. Blood platelets were normal. They say that "if the condition is due to telangiectases, they must be localized in the finer bronchi or in the pulmonary tissue." They were unable to find a similar report to theirs in the literature. "Idiopathic familial hematuria," reported by Apert, is mentioned as perhaps being "comparable" with their cases.

It seems probable, according to F. Parkes Weber, of London (1924), who has studied this subject extensively, that "gastrostaxis" cases, as reported by Sir William Hale White, and I may add, those reported by Pons, Meine and Blenkle (February, 1929), before our New Jersey State Society, may have been of similar telangiectatic origin.

Pons, Meine and Blenkle (*Jour. Med. Soc'y N. J.*, vol. 26, p. 143, February, 1929) did not mention telangiectasia as a possible cause for the hematemesis in their cases.

Foggie (*Edinburgh Med. Jour.* p. 280, May, 1928), of St. Andrew's University and Dundee Royal Infirmary, reports a case of a woman, now aged forty-seven years, who suffered from hereditary hemorrhagic telangiectasia with recurring hematuria. He was able to collect forty-one reported families, with his family making altogether forty-two. He includes the thirty-one family groups I was able to collect from the literature of the world up to 1920, inclusive, and reported in January, 1921. I did not include the cases of familial nosebleed mentioned by Sutton (1864) and Rosenberg (1900), and the case reported by Professor Vincent Tanturri, of Naples (*Morgagni*, vol. 21, August, 1879), under the title of "Un caso Di Dermostasi Venosa generale ed idiopatica." In this case no mention is made of epistaxis or other recurrent hemorrhages. The girl was fourteen years of age and had generalized telangiectasia.

Babington (1865), Richardson (1917), Boston (1930), and Goldstein (1922) reported cases of familial (hereditary) epistaxis. In 1922 I reported several cases of recurrent nosebleed in one family and recently I met with another family in which several members (father, sons and daughter) bled profusely from the nose.

Foggie's patient gave a history of nosebleeding in five generations associated with telangiectases. She only occasionally bled from the nose, but bled from the urinary tract for twenty years, due to these vascular dilatations.

T C Fox (1908) reported a case of bilateral telangiectases of the trunk with a history of marked epistaxis in childhood and recent rectal bleeding

Erasmus Wilson, of London (*Jour Cutan. Med. and Dis. Skin*, vol 3, pp 198-199, London, 1869), under "Clinical Memoranda" and the subtitle of "Eruptive Angiomata," reports a case of a publican, aged thirty years, who had copious bleeding from the gums and epistaxis and an eruption of red papulae on the face, neck, hands and arms—"Angiectasia," or multiplication and hypertrophy of the venous capillaries of the skin. He says "the case is very rare" He thought this was a sudden eruption of "angiomata and associated with hemorrhage from the mucous membrane of the nose and mouth." He fails to mention other members of the family with this condition

Kalischer (1901) reports a case of telangiectasia (Angiom) of the face and "Der weichen Hirnhaut" (*Archiv f Psychiat*, Bd 34, pp 171-180, Berlin, 1901) meninges

R H Keenan, of Sir Patrick Dun's Hospital (April 30, 1902) reported a typical family with telangiectasia and epistaxis. Kennan mentions Osler's report in the *Johns Hopkins Hosp. Bull.*, November, 1901. Osler, however, overlooked several previously reported cases of familial epistaxis, and of hereditary telangiectasia. He includes several of these in his second paper in the *Quarterly Journal of Medicine* (October, 1907, London), with colored plates of A. Brown Kelly's case (1906)

Rendu (1896) was the first to associate the tendency to epistaxis with multiple telangiectases as manifestations of a distinct clinical entity, now, however, frequently called "Osler's disease"

Time will not permit us to review the additional cases reported from 1876 to 1930. Suffice it to say, that Coe (1906) reported, erroneously, a case as hemophilia which was reported as a typical case of "hereditary telangiectasia" by Osler, and that since Legg (1876) and Chiari (1887) reported their cases there have been reported a total of sixty-five families and about 350 individuals suffering from hereditary (familial) epistaxis with hemorrhagic telangiectasia, including my cases reported January, 1921 (*Arch. Int. Med.*), and in 1922 (*Jour. Med. Society N. J.*, p 50, 1922), and including Koffer's cases (1908). Since the publication of my first

paper there have appeared a number of excellent reports on the subject. It might be of interest to list all the typical and atypical cases reported to date. However, I shall limit myself to the more easily accessible and available reports.

Recently, Professor Rudolf Schoen, of the Morawitz Clinic, in the University of Leipzig, reported two cases of "Familiare Telangiectasie Mit habituellen Nasenbluten" (affecting four generations), in the *Deutsches Archiv fur Klinische Medizin*, Bd 166, Heft 3/4, 1930.

A. Arrak (1925), of Masing's Clinic, in the University at Dorpat, Estonia, reported two families with hereditary hemorrhagic telangiectasia (*Deutsches Arch f Klin Med*, vol 147, pp 287-291, June, 1925).

Dore's case (1927) of multiple familial telangiectases was a woman, aged fifty-six years, who had had multiple telangiectases for fourteen years. She had them also on the tongue, lips, hands, under one nail, a few on the body. She suffered from frequent nosebleed. Her mother had multiple telangiectases. Patient does not know whether other members of the family were similarly affected. Electrolysis was tried. Dore used carbon-dioxide (CO<sub>2</sub>) snow. This was the third case of the kind Dore has seen. One of the patients (a man) said that the condition had been known in his family for a hundred years. The third patient was a young woman, but no other members of her family appeared to be affected.

F. Parkes Weber, of London, in discussing this presentation, said that "though the tendency was inborn, the lesions of the skin and mucous membranes manifested themselves or were often first observed at relatively late periods. The nosebleeding, however, was often noted earlier."

R. A. J. Harper (April, 1929) reports a case of a man, aged forty-five years, who had hemorrhages from the nose, gums and tongue. He had red "spots" on the cheeks and ears, tongue, gums and palate. Epistaxis was frequent. Stools were black at times. No blood in urine. His father and a sister (forty-seven years of age) and her two younger sons suffer similarly. The patient himself has seven children—three sons are well, while four daughters are all affected.

Willis C. Lane (University of Maine, March, 1916) reports

cases of "hereditary nosebleed," but no mention of telangiectasia is made

Schwartz, of Minneapolis (1925), reported a case in a woman, aged forty-nine years. She suffered from severe nosebleed since the age of fourteen. She had, also, severe hemorrhages from the tip of the tongue and from the tip of her right little finger. She had reddish "spots" on her face, tongue, soft and hard palate, nose, conjunctivae, auricles, cheeks, and hands, for many years. Her mother died of frequent and almost uncontrollable nasal hemorrhages. The coagulation time was five minutes, bleeding time two and one-half minutes.

Curschmann (April, 1931), of the Medical Clinic of Rostock, reports two families with familial epistaxis as an expression of "pseudohemophilia." He overlooked, entirely, the extensive literature now available on the subject of familial epistaxis and hereditary telangiectasia ("Rendu-Osler-Weber Disease"). Because of the free nosebleed in all these cases, Curschmann calls it "monosymptomatic bleeding without thrombopenia and without hemophilia." He advises the use of Roentgen-ray therapy over the spleen.

Kozach, of Hamburg, in discussing Curschmann's paper before the Northwestern German Association for Internal Medicine (at Hamburg-Eppendorf), January 31, 1930, mentioned a family suffering from epistaxis.

Thomson and Mason Lamb (1928), of Birmingham, England, reported a case of an unmarried woman of thirty years of age, who had severe bleeding from the mouth during the night, lasting nine hours continuously. The blood "ran in a stream out of her mouth." Since the age of twelve years she had had severe bleeding from the nose. She also bled from the ear, scalp and lip. Her father, paternal grandfather and one of the father's cousins were similarly affected. One of the father's brothers died at fourteen months, following hemorrhage after operation for a naevus (in 1876 or 1877). The patient's coagulation time was one minute and thirty seconds. The blood-calcium and cell fragility were normal. Blood Wassermann was negative. They discuss Sir Thomas Lewis' theories and explanations for the development of telangiectases.

Williams (1926) reports instances of hereditary hemorrhagic telangiectasia with nosebleed in four families. He believes that

the disease is "exceedingly common" While, perhaps, many cases go undiagnosed, I do not believe that the familial hereditary type of this condition is so very common I agree with Williams that the hereditary character of this condition is necessary for a correct diagnosis, and it is precisely this feature which is sometimes difficult to establish Further, the essentials of the disease entity described here are as follows (1) the occurrence of nosebleed in childhood, often recurring throughout the life of the patient, and sometimes associated with bleeding from other mucous membranes—stomach, bowel, bronchi, gums, etc., and even from the skin, lips, ears, fingers, conjunctivae, tongue, and meninges The bleeding may decrease, but very often becomes more serious and may even prove fatal as the patient grows older The mother of one of my cases died as the result of the severe nasal hemorrhages (2) The development of telangiectases, sometimes as *dilated capillaries*, or as aborescent, *distended venules*, or as small pinkish or dark red "spots," smooth and uniform, without visible venules which disappear completely on pressure—often only pin-point in size They may appear suddenly and last for several years and then disappear *Small nodular forms, raised*, and of bright red or purplish color may be met with These were formerly thought to be associated with malignancy of the stomach and liver We also meet with *spider forms* (naevus araneous type), often seen on the cheeks and eyelids of children and young patients, the *mat form*, being large lesions, sometimes seen associated with cirrhosis of the liver and leukemia, and lastly, the *generalized forms of telangiectases*, noted by Osler and so thoroughly discussed in one of the best papers on the subject by Becker, of Chicago (1926) In my paper I am discussing only the multiple hereditary forms of telangiectases associated with recurring hemorrhages, and present in several or many members of the family and in several generations (3) The occurrence of these symptoms in several members of the family is essential for the diagnosis We may have, however, in some members of the family, hemorrhages from the nose alone or from other parts of the body, with or without hemorrhagic hereditary multiple telangiectasia

Time will not permit the review of many interesting cases of this clinical entity I will simply list the typical and atypical cases reported in the entire medical literature of the world since 1830

*Typical cases of hereditary hemorrhagic telangiectasia* with recurring epistaxis and other hemorrhages Wilson (1869), Legg (1876), Chiari (1887), Chauffard (1896), Rendu (October 23 and November 24, 1896), Osler (1901), Josserand (1902), R H Kennan (April 30, 1902), A B Kelly (1906), Coe (1906), Hawthorne (January 13, 1906), Osler (1907), F P Weber (1907), Gottheil (1907), Kofler (1908), Ballantyne (1908), Semon (January 10, 1908), Waggett (1908), Phillips (1908), Hanes (March, 1909), Langmead (1909 and March, 1910), Laffont (October 30, 1909), Audry (January, 1911, and 1920), Osler (1911, mentioned by Steiner, 1917), Van Wagenen (1912), Sequeira (1912-1913), E Gjessing (1916), Hutchison and Oliver (January, 1916), H B Richardson (1917), W R Steiner (1917), S N Paul (1918), Gundrum (March, 1919), H I Goldstein (1921), W Freudenthal (1921), H L Goldstein (1922), Fitz-Hugh (December, 1923), Schwartz (1925), G L Gulland (May 19, 1923), East (October 12, 1923, and February 13, 1926), A Arrak (June, 1925), Emile-Weil (June 25, 1926), Williams (1926), Mekie (March 5, 1927), McKinstry (May, 1927), Archer (September 17, 1927), Balph (December 22, 1927), Mackay and McKenty (1927), Thomson and Mason Lamb (1928), Van Gilse and Postma (1928 and 1929), Roles (1928), Flandin and Soulle (January 2, 1929), Erdheim (February, 1929), Harper (April, 1929), Rudolph Schoen (1930), Boston (March, 1930), Curschmann (April 12, 1930), and Stengel-Fitzhugh, Jr (1930)

*Cases of familial epistaxis* Sutton (1864), Babington (September, 1865), Kennan (1902), Frohlich (1891), Verneuil (1894), Rosenberg (1900), Lane (1916), Blumenfeld (1926), Becker (1927), Griffin (1927), H I Goldstein (1930), and Ersner (1930)

*Atypical cases of (familial) epistaxis or hereditary telangiectasia* Taunton (1830), Tweedie (1841), Sutton (1864), Babington (1865), Tanturri (August, 1879), Vidal (1880), Frohlich (1891), Gaston (February 8, 1894), Verneuil (May 29, 1894), Ullmann (1896), Kopp (1897), F J Smith (1898), Blaschko (1899), Du Castel and Baudouin (1899), Kalischer (1901), Joseph (1904), Armand (1905), Weber (1907) mentions a case reported December 12, 1900, before the Dermatologic Society of London, with familial multiple venous angioma, W Bligh (February 23, 1907), Adam-

son (1907), Passini (1907), Pollitzer, Mayou (1907-1908), Lack (1908-1909), Fox (1908), Hyde (1908), Steiner and Voerner (1909), Galloway (1910), Frick (1912), Stokes (1915), Lane (1916), Miescher (1919), Miller (May, 1923), Blumenfeld (1926), S W Becker (1926), Giffin (1927), Becker (September, 1927), F P Weber (September 24, 1927), Memmesheimer (1928), H I Goldstein (1930), Kozach (1930)

Terrien and Prelat ("Telangiectasie généralisée et cataracte congenitale," November 6, 1909), and M Vulpian report cases dying from epistaxis and hemoptysis under the title "Hémophile—Pas d'antécédents d'hérédité ou de famille" (February, 1886)

*Familial hemorrhages*—hemoptysis, hematuria, hematemesis, bowel and rectal bleeding, and other atypical cases (non-hemophilic and non-purpuric) Atlee (1901), Guthrie (1902), Pearson (1904), Bennecke (1906), MacCallum (1906), Thomson (Belfast), Ohkuvo (1907), Grandidier, Kausch, Apert (1907), Aitken (1909), Adler (June, 1909), Mantchik (1922), Libman and Ottenberg (1923), Hurst (1923), Barford (1926), Fogge (1928), Virgil Schwartz (1925), and others

Miescher (1919) reports a case of telangiectasia in a woman, aged seventy-one years, whose mother died at eighty years from epistaxis. Her thirty-one-year-old daughter is well. She had telangiectases and tortuous capillaries on the nose, cheeks, forehead and legs. Blood Wassermann was positive. He reports a second similar case. He was able to find nineteen similar cases since Brocq's compilation. He fails to mention epistaxis or other hemorrhages in his two cases.

Steiner and Voerner (*Deutsch Arch f klin Med*, Bd 94, p 105, 1909) speak of "angiomatosis miliaris" and report several cases. They report a young man, aged twenty-nine years, with general symmetric telangiectases—pin-point to pin-head in size, on the chest, abdomen, genitalia, arms and lips. He had pollakiuria, quick pulse, neuralgias, and anidrosis.

Francis C Roles (*St Bartholomew's Hosp Jour* vol 36, November, 1928, pp 19, 20, London, 1928-1929) reports a case of multiple telangiectasis with splenomegaly, in a married woman, aged sixty-five years, a machinist, suffering from "abdominal pain and indigestion." She had red "spots" on the face and hands, nose,

lips, tongue, cheeks, and legs, which appeared to "come out" singly or in crops. Three years ago she had a thrombosis in the right calf which was diagnosed as cirrhosis of the liver. A large telangiectasis on one of her fingers bled profusely, there was no hematuria but increased frequency of micturition. She had severe epistaxis. No family history of epistaxis or of "spots." She had lesions of three types pin-point, spider form (most common), and the nodular variety. Three of the nodular type on a finger, each side of nose, and on left cheek bled quite profusely. The spleen formed a firm, well-defined tumor the size of an orange and showed a well-marked notch. It was not tender. The coagulation time was two minutes, twenty-seven seconds, and the bleeding time two minutes, thirty-six seconds.

P. Gastou (February 8, 1894) speaks of "congenital and hereditary vasomotor telangiectases" and reports the cases of a father and daughter. The father and daughter, and the paternal descendants, all had red hair and a very high facial color. Both father and daughter had generalized telangiectasis. When twenty-three years of age, the father had a "stroke" with left-sided hemiplegia, which almost entirely disappeared in two months. The daughter had vascular dilatations on the hands, and, after a confinement, the telangiectases showed a tendency to spread. He concludes that these cutaneous vascular dilatations may be the result of a vasomotor paralysis through congenital, hereditary or acquired modification of the vascular vasomotor centers, and he therefore designates the condition as "generalized vasomotor telangiectases." He fails to mention epistaxis or other hemorrhages.

Romme (*Presse Med. Paris*, April 24, 1909) reviews the literature and discusses hemophilia and hereditary hemorrhagic telangiectasia, but does not report any cases of his own.

E. Gjessing (1916) reports three cases. One of his patients, a man aged thirty years (whose father and sister were similarly affected), bled profusely from the nose when a child. Nosebleed became more severe as he grew older. He had bled from the mouth on one occasion. He suffered from heart disease, severe anemia, and from *retinitis hemorrhagica*.

Coschwitz (1616) mentions that frequent scratching with the

finger-nail at the anterior part of the septum may be responsible for epistaxis

Valsalva knew that the most frequent source of nosebleed was a site on the anterior portion of the cartilaginous septum. This site of predilection for nosebleed was later described by Michel, Little, Hartmann, Kiesselbach, Zuckerkandl, Hajek and others.

Rendu (*Semaine Med.*, vol 4, June 12 and 26, 1884) emphasized the interesting fact that epistaxis in a young patient (with or without valvular disease) is often a premonitory symptom of an attack of rheumatism, particularly in girls, when not occurring as vicarious menstruation.

Verneuil (May 29, 1894) speaks of "Juvenile, Hereditary and Heredo-hepatic Epistaxis" and reports illustrative *familial* cases. He speaks of familial and hereditary epistaxis as a reality. Forgues and Besnier say this form of hereditary epistaxis in children and adolescents occurs in families predisposed to spontaneous hemorrhage and which is often mistaken for hemophilia.

Curtius (November, 1928) speaks of nasal septum varicosities and Osler's disease as a manifestation of general hereditary dysplasia of the venous wall or a "status varicosus".

DuCastel and Baudouin (1899) report a case of hereditary telangiectasia in a man, aged twenty-five years. Other members of his family had the same conditions. No mention is made, however, of familial nosebleed.

Becker (September, 1927), in his paper on "Generalized Telangiectasia" reports (Case 2) the case of a girl, aged twenty-nine years, complaining of changes in the skin and nails. One sister and two brothers were subject to frequent nosebleeds, and her father also had nosebleed occasionally. She had nosebleed when in a warm climate, generally at the time of the menses. She had bilateral coronary cataract. She apparently had no telangiectatic lesions of the mucous membranes. Her finger-nails were abnormal, and she had marked follicular hyperkeratosis. Marked erythema of her cheeks and chin and dilated vessels were noted.

Flandin and Soulle (January 2, 1929) reported a woman, fifty-four years old, affected with hereditary hemorrhagic angiomas. She suffered from profuse epistaxis and had carmine-red vascular spots on the cheeks, chin, tongue, and fingers. She had an intense

anemia The bleeding and coagulation time were normal and the clots were retractile

Mekie's patient (March 3, 1927), was a man, aged thirty-eight years, who had numerous telangiectases on the lips, nose, cheeks, tongue, nasal septum, gums, soft palate and penis He suffered from frequently recurring nosebleed, and advanced pulmonary tuberculosis His father, grandfather, two uncles, one sister and three cousins were similarly affected His seven children, under fifteen years, were apparently not affected One of the affected cousins died at the age of twenty-eight years from a "ruptured vessel in the brain"

Kofler (Karl, 1908), reported a man, aged fifty years, who had repeated hemorrhages from the nose and lips He had "spots" (telangiectases) on the face, lips, nose, nasal septum, mouth, ears, scalp, extremities and trunk His mother and brother were similarly affected His children were apparently not affected

Kofler erroneously reports this case as "Naevus Pringle of the Skin" and while he knew of Osler's and Parkes Weber's cases, he did not think they were the same I consider this a typical example of hereditary telangiectasia with epistaxis (familial)

Van Gilse and Postma (1928), of the University of Amsterdam, report four cases (from two Dutch families) who suffered from severe persistent nasal hemorrhages as a symptom of congenital telangiectases of the skin and mucous membranes

Audry (January, 1911), reports the case of a man, aged seventy years, who for many years had almost daily nosebleed He had telangiectases on his face, lips, palate, tongue, trunk and arms His mother, great aunt, cousin, niece, maternal uncle, five brothers and sisters, his two sons and several nephews were all similarly affected He considers Chauffard's (1896), a non-familial (atypical) case

Langmead's patient (March, 1910), was a man, aged sixty-eight years He had thirty small telangiectases, and frequent nosebleed, occasionally the face or tongue would also bleed Secondary anemia was present in 1907 In 1909 the blood count was normal, and he was considerably improved Four brothers, one sister, his father, and two sons and a daughter of one of his brothers were similarly affected The patient's mother suffered from severe epistaxis

Erdheim (February, 1929), was able to collect from the litera-

ture fifty-five families with this disease. He reports six cases (who are now alive in one family) who have frequent attacks of epistaxis with no serious consequences. He also gives reports of five cases deceased, two of whom probably died as the result of the severe repeated hemorrhages. He is convinced from his studies of forty-nine cases that the telangiectatic lesions were first noticed in thirty-one cases under the age of thirty, and in the other eighteen past the age of thirty. The lesions seem to become aggravated in many patients in later life.

Fatal hemorrhages in some of these cases were reported by Kelly, Legg, Chiari, Phillips, Gottheil, and others.

Paul (1918), reported the first Australian cases. He reported a woman, aged thirty-two years, with hereditary angioma and epistaxis. He traced the disease as far back as the great-grandmother and both her daughters, and grandmother of Paul's patient. Twenty-one members of this family were affected.

Archer (September 17, 1927), reported a case of multiple cavernous angioma ("of the sweat ducts") associated with hemiplegia in a man, aged thirty years. One brother shows the same telangiectatic lesions. Parents are alive and well. Patient suffered from frequent attacks of bilateral frontal headache. In 1918 he developed a right hemiplegia (at twenty-one years of age). The attack came on suddenly during the day. Complete recovery took place in two years. In 1922, he had a similar attack in addition to involvement of the left side of the face with loss of speech. There was no loss of consciousness in either attack.

He recovered completely from the last attack, except for pain in the extremities and back. The patient seems mentally dull. He always feels "cold." The optic discs show a varicose and degenerated condition of the retinal vessels, but no hemorrhages. The skin shows multiple, small, pin-head, disseminated angioma distributed over the lower thorax, abdomen, sides of trunk, buttocks, thighs and genitalia. The mucous membranes of the lips, cheeks, and soft palate were also involved, but not the tongue. Spinal fluid and blood Wassermann tests were weakly positive. No reports of the blood platelets, blood chemistry, basal metabolism, X-ray of the sinuses, skull and teeth were included. No hemorrhages from the nose or mouth are mentioned. Archer considered the

to bleeding from a similar (angiomatous) varicose and degenerated condition of the vessels in the brain. He mentions, further, that such mental sluggishness is a frequent symptom in lichen planus, adenoma sebaceum and hypothyroidism.

McKinstry's patient (May, 1927), was a girl, aged nineteen years, with advanced bilateral pulmonary tuberculosis. She bled from the nose and had five or six punctate subcutaneous hemorrhagic spots on the tips of her fingers, and "spider webs" (telangiectatic) in the anterior part of the nasal septum. Her father was a "bleeder."

Laffont (October, 1909), mentions the observations by Kopp, Chauffard, Rendu, Steiner-Voerner, Blaschko, Joseph, and Hanes, and reports his own cases. He divides the cases into hemorrhagic and non-hemorrhagic types.

Hart-Drant (May 14, 1923), reported an atypical case of acquired multiple punctate telangiectases of seven years' duration in a white woman, aged forty years. Epistaxis is not mentioned.

I shall not review in this paper the interesting cases reported by Guthrie (1902), Aitken (1909), Legg (1876), Hutchison and Oliver (1916), Gundrum (1919), Osler (1901, 1907, 1911), Hanes (1909), Steiner (1917), F. Païkes Weber (1907), Fitz-Hugh (1923), East (1926), Griffin (1927), Ralph (1927), L. N. Boston (1930), Van Gilse and Postma (1928, 1929), and others.

Josseiland (1902), reported a case of a woman, aged fifty-six years. Her father and two brothers had frequent profuse hemorrhages from the nose. The woman bled frequently from the nose, lips, gums and tongue. Her cheeks were studded with vessels which were confluent. Varicosities extended into the orifices of the nose and on both sides of the septum. There were small angiomatous spots, more marked on the left side of the septum, and some on the middle and inferior turbinate bones. There were telangiectases on the face, lower lip, tongue, and palate, also on the neck, breasts, arms and back. The younger brother, who was also examined, had the same kind of telangiectatic lesions.

Vulpian (1886), reports a patient, aged thirty years, who bled from the nose several times a week. He had later "ecchymoses" on the index and middle fingers of both hands. After contracting syphilis at twenty years of age, he bled from the nose two or three times daily. There were very dark ecchymotic areas on the helix.

of both ears. At one time the anemia was very severe—less than one million red blood-cells. He also bled from the gums, and finally died from profuse epistaxis. There were no other cases of "hemophilia" in the family.

Vidal (1880), reports a case of a woman, thirty-one years of age, who had symmetrically generalized telangiectasis. No hemorrhages are mentioned.

Letienne and Arnal (1897), report multiple telangiectases with Basedow's disease in a woman, twenty-seven years of age. Other members of the family were well.

Blaschko (1899), Brocq (1904), Sachs (1925), Hofmann (1927), Terrien and Prelat (1909), and others, discuss "telangiectases," but not of familial occurrence and without hemorrhages.

Bonhomme de Montaigut in his Thesis (Paris, 1882), discusses epistaxis of varicose lesions of the nasal fossae. This form of epistaxis, he says, usually occurs in adults. The hemorrhage increases in severity with age. "Most of the cases reported began between the ages of fifteen and twenty, but as they grew older the hemorrhages became more severe."

Matthew S. Ersner (1930), of Philadelphia, reported several cases of Osler's disease, typical familial cases of hereditary epistaxis with telangiectasia, occurring in two families. He reported these instances, in discussing Goldstein's paper (June 13, 1930), before the State Medical Society of New Jersey, at Atlantic City.

Brown Kelly (1907), reported three cases of Rendu-Osler's disease.

A woman, aged forty-eight years, had nosebleed since childhood. "Spots" were first noticed, when twenty-nine years of age, on the face, then on the ears, lips, fingers, hands, breast, nose and tongue. She died as the result of severe epistaxis.

Her father, daughter, and a sister had the same trouble. He reports a case of a woman, aged thirty-five years, who suffered from severe nosebleed and many telangiectases on the right side of the face, nose, soft palate, uvula, and faucial pillars. The temperature (surface) was higher on the affected (right) cheek, due to the angioma in the cheek.

Waggett's patient (1908), was a man, aged fifty-five years, married, but without children, a player of ~~w~~ who

bled from the nose, face and lips. A sister has the same trouble. Telangiectases are present in the nose, on septum, middle turbinate, on the tongue, lips and cheeks.

Ballantyne (1908), reported three cases of multiple telangiectases in one family (Hollanders, of the farming class).

Telangiectases were present on the palpebral conjunctivae, lips, cheeks around nostrils, roof of mouth, tip of tongue, and under nail of fourth finger (right) in the case of the daughter, aged twenty-six years. She had frequent hemorrhages from the nose. Ballantyne refers to Kelly's paper, and states Kelly's cases closely resembled two of his cases.

It is possible that some of the cases of essential hematuria reported by Conner and Bumpus (1927), of the Mayo Clinic, may have been instances of Osler's disease ["Telangiectasia (hereditary) with hemorrhages"] Calcium estimations, bleeding time and blood-platelets were normal in a number of their cases. Blood coagulation time in a few of their cases was prolonged. Blood calcium was low in many of their cases.

MacCallum (1906), Laboulbene (1872), Boyer (1877), Hektoen (1897-1899), Laci (1882), Bennecke and others reported cases of intestinal hemorrhage from telangiectases, "phlebectasies," and dilated venules and capillaries in the walls of the stomach and intestines. Some of the cases proved fatal. MacCallum's patient, aged fifty-four years, had multiple cavernous hemangioma throughout the entire small intestine.

In the December volume of the INTERNATIONAL CLINICS, I shall report further upon the three families with Osler's disease in whom epistaxis occurred repeatedly and profusely, with a colored plate of one of them by Mr. William B. McNett, of Philadelphia.



tions are removed with forceps. Sometimes lipiodol is introduced to make a pneumonogram and also as a therapeutic measure.

The cases presented will illustrate the value of bronchoscopy in the treatment of suppurative pulmonary diseases, and particularly of chronic abscesses.

#### CASE 1 CHRONIC PULMONARY ABSCESS

A man aged 36 was referred by Dr E May to Cochin Hospital. He developed an acute pulmonary condition in August 1928. There was marked evidence of involvement of the lower lobe of the lung. X ray examination demonstrated a large central abscess in the left lung.

Medical treatment was given during 3 months without any effect and the general condition was very serious. Surgical intervention was contraindicated.

A prudent bronchoscopic treatment was begun (December 1928) and during 4 months 5 bronchoscopic treatments were given. The clinical signs and the general condition showed rapid improvement. The patient was discharged from the hospital symptomatically well. X ray examination with introduction of lipiodol showed (March 1929) that the condition of the lung was improved, but some small bronchiectatic abscesses being discovered, the bronchoscopic treatment was continued at long intervals. Another pneumonogram showed definite cure in March 1930.

#### CASE 2 CHRONIC ABSCESS OF THE LUNG

A man aged 23, referred to Laennec Hospital, by Dr Lardennois, surgeon, suffering from a chronic abscess of the right lung.

The beginning of the disease was in July 1929, and we saw the patient in December. His general condition was very serious. X ray examination showed a large involved area in the middle of the right lung, but a cavity was not demonstrable. We performed bronchoscopic treatment during 2 months and the general condition was rapidly improved, but X ray examination showed a cavity which was not apparent before the bronchoscopic treatment, whilst the involved area was diminished. Aspiration was continued during 2 months and in this period the patient had good phases and bad phases. He is now in a good phase. X ray examination shows absence of cavity and the involved area is much smaller. This case demonstrates that recurrences may appear, and that there is necessity to continue bronchoscopic treatment. On the other hand, X ray appearances of the abscesses can vary greatly from one week to another.

#### CASE 3 BRONCHIECTASIS

A man, aged 21, referred to Laennec Hospital by Dr Leon Bernard. Temperature was normal, and the general condition was pretty good, but the patient suffered from dyspnea and coughed up about 300 cc of foul sputum in 24 hours. X ray examination revealed involvement in the middle and lower lobes. The introduction of lipiodol showed cylindric bronchial dilatations.

Bronchoscopic aspiration was performed and local medication given at about a week's interval. In all, eight bronchoscopic treatments were given.

The patient made excellent progress toward recovery. The dyspnea disappeared and the quantity of sputum was reduced from 300 cc to from 30 to 50 cc in 24 hours. A pneumonogram showed that the condition of the lung was much improved. Bronchoscopic treatment is being continued.

#### CONCLUSIONS

These cases indicate that bronchoscopic treatment should be performed as early as possible in every case of chronic pulmonary disease.

This initial bronchoscopic treatment, the first real therapeutic measure to employ in addition to medical treatment, often transforms the general and local broncho-pulmonary condition.

If, after this initial and indispensable preliminary series of bronchoscopic aspirations, surgical intervention is decided upon, it is done in the best conditions, if it is not indicated, either because the patient is recovering or because external operation is inadvisable, bronchoscopic drainage should be continued until complete recovery, or as a palliative treatment.

Of course, the prognosis is influenced by a number of factors: etiologic, anatomic, topographic, and bacteriologic.

In addition, we must be on the look out for recurrences of the lesions and follow the patient until the pneumonograms show complete cure. Frequent X-ray examinations must be made.

As for bronchiectasis, if the condition is recognized early and treatment begun early, some patients may be cured and "saved from the fate of chronic bronchiectasis."

Contraindications excepted (profuse and recent hemorrhages, pleural involvement, acute pulmonary tuberculosis, aneurysms of the aorta, very serious cardiac or kidney diseases, hopeless cases) bronchoscopy can be safely carried out in trained hands, though it requires the cooperation of Internist, Roentgenologist, Surgeon, and Bronchoscopist.

# Paediatric Contributions from the Heckscher Institute for Child Health of New York City

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## ORTHOPAEDIC EXAMINATION OF THE CHILD

By WILLIAM L SNEED, M.D.

New York City

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A ROUTINE periodic health examination of the child who visits the average clinic has been of benefit especially from the standpoint of prevention of deformities. A large percentage of the abnormalities in children seen by the orthopedic surgeon are amenable to treatment resulting in improvement or a cure, which would otherwise be difficult to correct were the child allowed to go unnoticed until adolescence. It is therefore important to attempt a rather simple and uniform method for the orthopedic examination of the child.

One cannot too strongly emphasize the necessity of the child being nude so as to facilitate a careful and systematic examination. When inspecting the child one should note the size of the patient, shape of the body and limbs, whether the child is obese or undernourished, the color and texture of the skin in the child and parents, and whether the patient is of average intelligence.

As the child stands erect and faces the examiner it is to be noted whether the head is held straight or to one side—as for example in “Wry Neck” or torticollis where the head is drawn to one side. The shoulders should be of equal height and rounded contour—to differentiate the atrophy of the shoulder muscles seen in cases of Erb’s paralysis. Note also the “carrying angle” of the forearms, in relation to the elbow, abnormalities of which are also met with in patients with Erb’s paralysis. Observe whether the normal longitudinal line seen passing through the umbilicus extends straight up to the point of the chin. Deviations from the normal are encountered in scoliosis.



In this position the entire limb is pulled upward from the hip. The earliest signs of affections about the hip joint will be manifested by limitation of extension and abduction, the child assuming the painless attitude of flexion and abduction of the hip.

The gluteal fold is of significance, especially in detecting congenital dislocation of the hip even before the child commences walking.

*Spine.* A routine examination of the spine will do a great deal toward the prevention of deformities which so often develop insidiously and yet go unnoticed by the parents. It is essential that the examining room be well lighted so as to eliminate shadows. As the child stands erect the alignment of the spine is noted. First, whether there is any exaggeration of the normal lordosis in the cervical spine, the normal kyphosis in the dorsal region and the normal lordosis in the lumbar region. Secondly, is there any lateral curving of any portion of the bony spine—known as scoliosis.

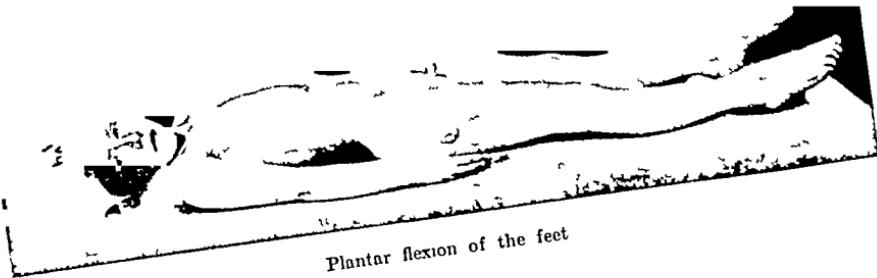
Passive movements of the spine are to be preferred during the examination because of the difficulty in young children to carry out active movements.

*Flexion of the spine.* The knees are maintained in full extension while the child bends forward from a standing position and touches the toes with his finger tips, as illustrated in Fig. VII. While in this position there should be a rather smooth contour of the flexed spine as distinguished from the knuckling seen in advanced or even healed cases of Potts disease.

In Fig. VIII the spine is shown in hyper-extension with the child lying prone, hyper-extension also being demonstrated in Fig. IX when the child is standing. Lateral bending of the spine should be quite free on either side and is shown in illustration number X.

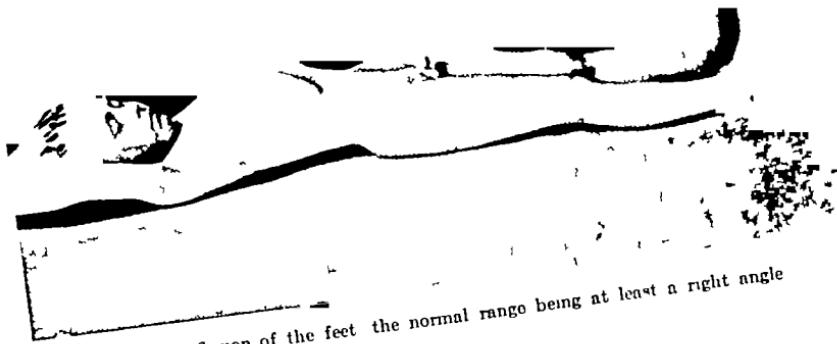
*Upper Extremity.* The normal range of motion in the upper extremity consists essentially of complete flexion and extension at the elbow joint, and pronation and supination of the arm. The normal range of motion in the wrist, hand and fingers need little or no mention in a brief paper such as this is. The shoulder joint possesses motion in a manner similar to that of the hip—abduction, adduction, external and internal rotation, flexion and extension. Fig. XI illustrates rotation and extension of the shoulder joint, about  $\frac{1}{3}$  of which is attributed to scapular motion.

FIG 1



Plantar flexion of the feet

FIG 2



Dorsiflexion of the feet the normal range being at least a right angle

FIG. 3



Flexion of the knees upon the thigh and the hip upon the pelvis

FIG 4

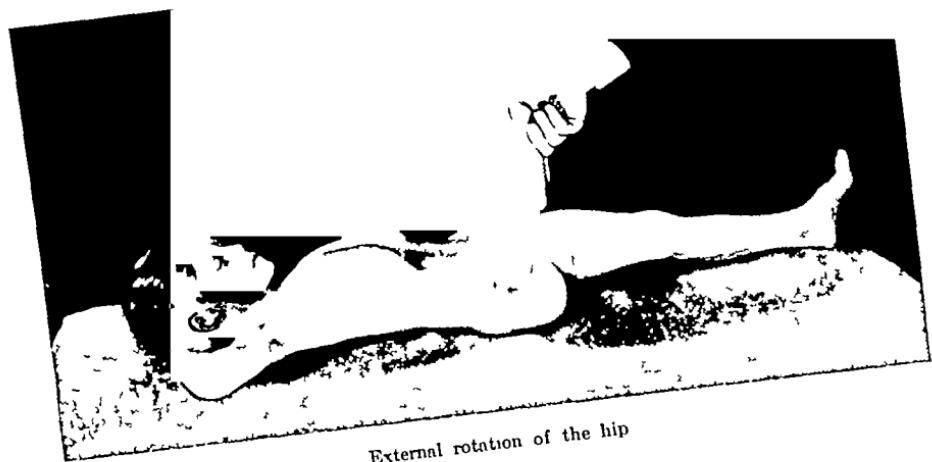


FIG 5

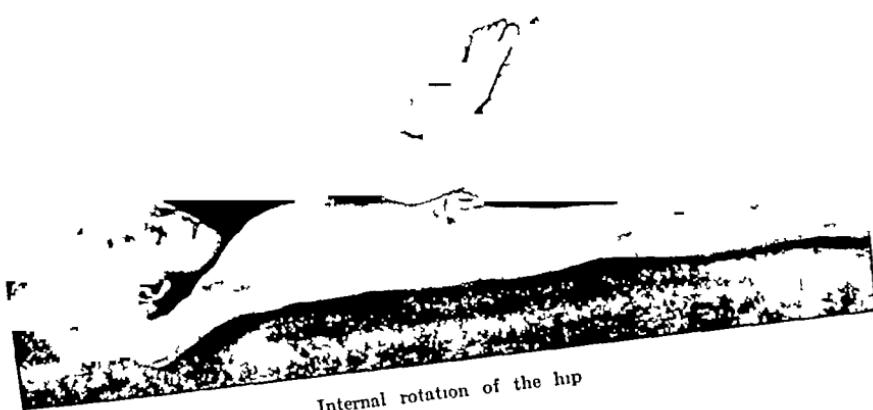


FIG 6



9

Normal range of abduction of the hip

FIG 7



Method of demonstrating flexion of the spine.

FIG 8



Hyper-extension of the spine with the child lying on the stomach

FIG 9



Hyper-extension of the spine with the child erect

FIG. 10



Lateral bending of the spine

FIG. 11



Rotation and extension of the shoulder joint



## THE POSSIBILITIES OF PREVENTIVE MEASURES WITH RESPECT TO INFECTIONS OF THE CENTRAL NERVOUS SYSTEM

By JOSEPHINE B. NEAL, M.D.

Chief of the Meningitis Division, Research Laboratory, Department of Health,  
N.Y.C., Executive Secretary, Matheson Commission, Encephalitic Research,  
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THE use of preventive measures with respect to poliomyelitis and epidemic meningitis is as yet purely empirical. The low morbidity of both these diseases makes the establishment of definite facts with regard to their prevention very difficult. Amoss has shown that the secretions of the healthy naso-pharynx have certain neutralizing powers for the virus of poliomyelitis. It is therefore reasonable to assume that individuals with a healthy naso-pharynx will be less likely to contract the disease, other factors being equal. It is also probable that convalescent serum and also the serum or whole blood of healthy adults who have not had poliomyelitis—it has been shown that the serum of many normal adults has the power of neutralizing poliomyelitis virus almost to the same degree as the convalescent serum—might be used as a prophylactic measure during epidemics. Injections of such serum would need to be repeated every four to six weeks, and it is therefore a measure the use of which would be considerably limited.

In the case of epidemic meningitis, it is commonly accepted that the portal of entry is through the naso-pharynx, and it is reasonable to assume that an unhealthy condition would lend itself to the development of the disease. A certain amount of experimental work has been done in the way of inoculating individuals with several doses of a meningococcal vaccine. Just how much value this vaccination has in preventing the development of epidemic meningitis has not been ascertained.

It is well known that a large percentage of cases of meningitis due to organisms other than the meningococcus and of brain abscess

develop from acute or chronic otitis media, mastoiditis or infection of the accessory sinuses. An unhealthy condition of the nasopharynx, adenoids, enlarged tonsils, deviations of the septum, enlarged turbinates, play no small part in the development of these infections. Children with these defects are more susceptible to colds, and infections of the upper respiratory tract have a greater tendency to become chronic, with the resulting development of otitis media, mastoiditis or sinusitis. The high mortality of meningitis due to organisms other than meningococcus and of brain abscess, makes it imperative that all measures that may prevent these diseases should be employed. The writing of Dr. Wells P. Eagleton emphasizes again and again the importance of removing the foci of infection before meningitis or brain abscess develop. Dr. Lewis A. Coffin in a personal interview also stressed the role that infected sinuses or otitis media play in the development of meningitis and brain abscess and to the necessity of a careful study of these conditions.

Looking back over an experience of twenty years in dealing with acute infections of the central nervous system, one cannot fail to be impressed with the number of cases of meningitis that it would seem might have been prevented if adequate attention had been given early to the treatment of sinusitis, otitis media, the removal of diseased tonsils and other conditions that make the upper respiratory tract unhealthy, and lower the resistance of the individual. As a result of a sinusitis, otitis media, etc., there may sometimes develop a condition known as serous meningitis or meningitis sympathica.

The classical signs of meningitis are present and also a spinal fluid of a greater or less degree of haziness under increased pressure with a large number of cells, often times a thousand or more, the polymorphonuclears predominating, no organisms by smear or culture, a slight to moderate increase in protein and a normal sugar content. If the focus of infection is promptly removed or if the inflammatory process spontaneously subsides, a complete and fairly speedy recovery may take place. Under less favorable circumstances this serous meningitis which is due of course to an inflammatory process near the meninges, is the first step in the development of a

true purulent meningitis with the organisms invading the meninges and the spinal fluid

How much can be done to prevent the development of meningitis and brain abscess by the careful examination of the naso-pharynx, sinuses and ears, to discover the presence of defects and by instituting measures to correct these defects when possible, only time can tell. It is certainly work which has been too much neglected in the past and which demands intelligent and intensive study in the future

# THE DIAGNOSIS OF HEMORRHAGIC DISEASES IN INFANCY AND CHILDHOOD

By I NEWTON KUGELMASS, M D, Ph.D

From The Department of Paediatrics, The Fifth Avenue Hospital, and The Heckscher Institute for Child Health

HEMORRHAGIC diseases constitute a variety of disorders with a common tendency to bleed. They may be manifested in the form of petechial spots, purpuric extravasations or loss of blood from free surfaces. Or they may be latent and not be discovered until the child is subjected to medical examination. Therefore the physician must be on the alert to observe any hemorrhagic tendency in the course of examination. Percussion of the patellar tendon to elicit knee jerks or cutaneous tests for diphtheria, or tuberculosis may cause subcutaneous bleeding. But usually there is a bleeding history previously unsuspected of hemorrhagic disease by the parents.

## I VASCULAR CHANGES

Bleeding results from an alteration in either the vascular system or its blood content. Congenital telangiectases in the nose or skin may give rise to bleeding. They cannot be confused with hemorrhages. Vascular naevi are usually raised above the surface of the skin, pale on pressure with prompt return of color. Pale birth marks on the baby's forehead are usually telangiectases extending from the bridge of the nose to the hair line. They are also seen in the nape of the neck extending to the hair line. They are probably due to delayed retrogression of fetal vascularization and usually disappear in a few years.

Trauma frequently produces hemorrhagic spots in children but they are not pathologic. But a multiplicity of black and blue spots persisting and recurring should incite attention regarding possible potential hemorrhagic disease. The clotting time determination is not a true index of the hemorrhagic status of a child. It may be normal though spontaneous bleeding be present as in purpura and jaundice where we know that the clotting mechanism is deficient. On

the other hand, the clotting time may be delayed when there is no hemorrhage. The author and his associates developed simple methods of blood examination for the determination of the blood clotting function of a child.

Congestion may produce hemorrhages in any of the child's tissues. Hemorrhages into the conjunctivæ, into the skin of the eyelids, from the nose and bronchi are not infrequent in pertussis. Hemorrhages in the lower extremities may be due to heart disease or nephritis. Insect bites leave a dark center on a bright urticarial base. They are usually limited to exposed parts of the skin and are fairly uniform in size.

Hemorrhages into the skin in the course of infection constitute a variety of purpuric manifestations with injury to the blood-vessels. The blood shows no changes in the blood clotting constituents and the blood platelets are normal. Purpura simplex or purpura rheumatica and Henoch's purpura are the conditions belonging to this category. But a more familiar bleeding problem in infants is scurvy. One of the earliest manifestations is the softening and bleeding of the gums around the recently erupted teeth and the appearance of red blood-cells in the urine. The onset is gradual, most commonly between the ninth to the fifteenth month of life when the mere handling of the baby causes pain due to swelling of the long bones. Bleeding into the eyelids or into the orbit cause exophthalmos and petechial hemorrhages may be observed over the hard palate.

### III. BLOOD CHANGES

Melena neonatorum rarely occurs after the third day of life and that occurring after the second week is usually due to sepsis or syphilis. In the newborns, hemorrhages due to injury may be present at birth and hemorrhages into the sclera and into the fundus of the eye are present in 10 per cent of all normal babies. The increased clotting time of the newborn's blood during the first week may be a factor contributing to the development of cerebral hemorrhage. The actual blood deficiency is in the prothrombin content.

True hemophilia is hereditary, affecting the male members of the family and transmitted by the mother. It may be manifest at birth when severe hemorrhages appear from the umbilicus. Extravasates into the joints may be confused with arthritis. Slight

trauma may cause fatal hemorrhages. All the clotting factors are normal in hemophilia. But the efficiency of the platelets is very low. Normally the platelets disintegrate rapidly to favor coagulation but in hemophilia their slow rate decomposition is the immediate cause of hemorrhage.

In purpura hemorrhagica the bleeding consists of large extravasates of blood under the skin and from the mucous membranes of the nose, intestine, etc. The bleeding time is increased because of the marked diminution of platelets. Therefore, the clot cannot retract and the gelatinous mass fails to close the wounds. The onset is usually without prodromes and without fever. It may be distinguished from lymphatic leukemia by the blood picture.

Infectious disease may be accompanied by hemorrhagic manifestations. We have found definite changes in the composition of the blood clotting constituents. Antithrombin content is increased, and in jaundice the bile salts actually dissolve fibrin and hence prevent its formation during the coagulation process. In severe measles, small-pox and chicken-pox, the eruption may become hemorrhagic, leaving more marked pigmentation. In diphtheria the bleeding occurs in the affected mucous membrane and nasal diphtheria is particularly prone to hemorrhage. Scarlet fever often presents minute skin hemorrhages in the deeper folds. In meningococcus meningitis a purpuric eruption is not uncommon. The eruption may last for forty-eight hours and then leave a brownish stain. Fulminative purpura is the result of sepsis. Miliary tuberculosis presents occasionally small skin tuberculides particularly over the abdomen and extremities. Chemical poisons may also cause cutaneous bleeding.

#### HEMORRHAGIC DISEASES IN INFANCY AND CHILDHOOD

##### Vascular Changes

###### 1 Congenital

Vascular Naevi

Telangiectases

###### 2 Trauma

###### 3 Congestion

Insect bites

Nephritis

Whooping Cough

Heart Disease

## 4 Infection

Purpura Simplex  
Henoch's Purpura

## 5 Deficiency

Scurvy

## Blood Changes

## 1 Congenital

Melena Neonatorum  
Hemophilia

## 2 Toxic

Thrombocytopenic Purpura

## 3 Infection

Chicken Pox  
Small Pox  
Measles  
Scarlet Fever  
Meningitis  
Tuberculosis  
Catarrhal Jaundice

## 4 Chemicals

Arsenic  
Phosphorus  
Quinine  
Antipyrin

## SPEECH DISORDERS

By JAMES SONNETT GREENE, M D

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NORMALLY a child begins to hear and to react to sounds about the fourth day. At the end of the first month he recognizes sounds, and at the end of the third month the instinct to imitate sounds appears. The first words he picks up are of course gained through his hearing and his instinct of imitation. It is from hearing his mother say "ma ma" or "da da" that he learns to say it. His articulate speech usually begins when he is about nine months old, and the normal thing is to make rapid progress during his second year in understanding the words he hears and using words correctly. In his third year the child usually begins to fashion words into phrases and sentences under the direction of his own conscious intelligence.

To parents the development of the child's speech faculty is a source of continual joy, and the general idea would seem to be that straightforward normal standard speech is something that a child picks up just naturally. That is true in the majority of cases but unfortunately a percentage develops speech defects from one cause or another. These cases are not given the consideration they deserve and often entire reliance is likely to be placed on the "happy-go-lucky" idea that they will outgrow it in time. Experience has proven that this is not so, for in our country there are thousands of children suffering from all forms of speech disorders, and according to Government statistics they outnumber the blind and the deaf.

One of the most pernicious and far-reaching of these disorders is stuttering speech. Stuttering is speech of a hesitating nature which is conditioned on certain states of mind in the form of emotions, feelings, attitudes, or ideas. The continuity of the stutterer's speech is interrupted by spasms of the muscles involved in speech production. The stutterer is able to enunciate every sound or com-

bination of sounds His defect lies in conversation not in enunciation

Stammering which is often used as an interchangeable term for stuttering is an entirely distinct speech anomaly Stammering is speech of a defective nature It may be either of a central brain involvement or of a peripheral involvement In stammering there is an inability to form correctly any or all of the sounds of speech The continuity of the stammerer's speech is never broken but the enunciation is at fault.

Numerous diseases or conditions involving the brain and nerves give rise to various forms of stammering speech (Central involvement) such as Imbecility, Idiocy, Hereditary Ataxia, Amaurotic Family Idiocy, Progressive Muscular Atrophy, Congenital Hydrocephalus, Spastic Spinal Paralysis, Bulbar Paralysis, Injuries of Cruscerebi, of Pons, Infantile Cerebral Palsy, Syphilis, Acute Polienccephalitis, Multiple Sclerosis, General Paresis, Bell's Palsy, Post Diphtheritic Paralysis, Tumors of the Speech Areas, or of the Medulla, Epilepsy, Chorea, Spasmodic Tics, Hysteria, Insanity The nature of the peripheral organic involvement is either congenital, such as Hare-lip, Cleft palate, malformations of the tongue, jaw, conditions, etc , or it is acquired, such as conditions of lips, teeth, gums, palate, tongue, pharynx, larynx, ears, etc The fact is that the person who stammers usually presents a pronounced series of symptoms which show in his abnormal speech irrespective of whether the condition is due to a central or a peripheral involvement

When we reflect that speech is preeminently the medium of human intercourse, that speech rather than bread is the staff of human life, that a child's training at school and college, his happiness and social life, his success in business all depend on it, that everyone in order to get on in our human social organization must be able to give an account of himself, must be able to sell his services and ideas, if not his goods, to others and that this can only be done effectively through normal standard speech, we must conclude that anything done for defective speech sufferers is a vital necessity and the all-embracing program for child health which is being organized by the Heckscher Institute must prove of immense value

## DERMATOLOGIC PROBLEMS MET WITH IN PREVENTATIVE MEDICINE IN CHILDREN\*

By JOSEPH JORDAN ELLER, M.D.

New York City

MANY disturbances of the skin, such as pigment anomalies, Recklinghausen's disease, allergic manifestations, urticaria, angioneurotic oedema, certain infantile eczemas, epidermolysis bullosa, albinism, xeroderma pigmentosum, syringoma, adenoma sebaceum, canities, ichthyosis, monilethrix, ectodermal defects, and skin cancer, seem to be conditioned by hereditary factors. In certain instances we are able to find other members of the family afflicted with the same conditions or a history in previous generations of the family. Frequently however there is no such history. It is our intention at the Heckscher Institute to check up on the significance of hereditary factors regarding the influence they have on the incidence of these familial skin conditions. An effort will be made to estimate the dominant or recessive qualities of these conditions or the influence of sex linkage. This problem should be studied thoroughly in order to find out if it is possible to control the future incidence of these skin conditions by eugenic advice.

Another problem that deserves an effort to control, are the contagious skin diseases found in children. They are impetigo contagiosa, molluscum contagiosum, fungus infections, and the acute exanthemata. The control of these conditions must be looked for by immediately segregating children at their first sign of skin eruptions particularly in schools, camps, hospital wards, or wherever large numbers of children are brought together.

Ringworm and favus of the scalp are contagious fungous infections which cause baldness with scarring in children. They hitherto took from two to three years to be cured and can now be cured by one treatment with X-rays. The dosage is so measured that there is a complete falling out of the hair in seventeen days. With it the infectious agent falls out and the hair returns in two or three months.

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\* From the Heckscher Institute for Child Health

free of the disease. At one hospital in which there was an average of 300 children the year round suffering from these conditions before the technique of X-ray treatment was used, there are now but a few isolated cases left.

The prevalence of congenital syphilis will be greatly reduced by treating the syphilitic mother during the entire period of her pregnancy and the child for some time, starting immediately after birth, especially if the cord gives a positive Wasserman blood reaction.

The dermatologist in working out some of the above problems should be of assistance to the workers in preventative medicine in children.

(Further articles in this department will be found starting on page 262 )

# Surgery

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## A REVIEW OF SURGERY OF THE COLON AND RECTUM AT THE MAYO CLINIC FOR THE YEAR 1929\*

By FRED W. RANKIN, M.D.

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A YEAR's work, in retrospect, should furnish ample opportunity for considering ways of improvement in any field of surgery, if one profits by unhappy experience. Also, it should provide occasion for congratulation on satisfactory accomplishment of individual surgical maneuvers or on pleasing end-results.

In the section on surgery of the large and small bowel, exclusive of the duodenum, commendable progress from four standpoints may be reported: (1) a marked increase in the number of patients registering at the clinic with diseases of the large bowel and rectum, (2) a very marked decrease in the immediate operative mortality, (3) highly satisfactory improvement in the roentgenologic diagnosis of lesions proximal to the middle of the sigmoid flexure, not approachable by proctoscopic examination, and (4) the cooperative attitude of the clinical staff in accepting a regimen of consultation similar to that which now exists in the sections on urology and goiter.

Segregation of the group of patients with disease of the large bowel and rectum, and hospitalization as a routine, demanding individualization of each case, and selection of an operation which was deemed most satisfactory for use in each case, unquestionably are the greatest factors in the reduction of mortality. In 102 cases of carcinoma of the large bowel proximal to the middle of the sigmoid, as proved at operation, roentgenologic diagnosis of malignancy was in error only three times, a most remarkable and satisfactory percentage, comparable to the best records of gastro-intestinal diagnostic accuracy.

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\* Submitted for publication June 3, 1930

The entire group of cases contained in this report numbers 527, an increase of more than 15 per cent in the number included in last year's report. In this series are not included the acute emergency conditions in patients who are suffering from complete obstruction at the time of their registration in the clinic, and who require enterostomy or cecostomy for their relief.

TABLE I

*Diagnosis of surgical diseases of the ileum, large intestine and rectum*

	Cases
Carcinoma	353
Carcinoma with fistula, diverticulitis or polyposis	23
Lymphosarcoma	1
Epithelioma (three cases) with intussusception (one case)	4
Diverticulitis (sixteen cases) with fistula (four cases)	20
Diverticulum of cæcum	1
Diverticulum, Meckel's, with Lane's kink and adhesions	1
Polyposis or polyp	9
Tuberculosis	12
Ulcerative colitis	10
Intestinal obstruction, chronic or subacute	22
Intestinal obstruction, chronic or subacute, with mobile cæcum	1
Intestinal obstruction, chronic or subacute, with fecal fistula	2
Intestinal obstruction, chronic or subacute, with inflammatory tumor	1
Intestinal obstruction, chronic or subacute, with Meckel's diverticulum	1
Intestinal obstruction, chronic or subacute, with Lane's kink	1
Lipoma of cæcum	1
Fecal fistula	15
Lane's kink (fourteen cases) with adhesions (three cases)	17
Prolapse cæcum (three cases) and prolapse rectum (three cases)	6
Adenomyoma of rectum (two cases) and inflammatory lesions of colon (three cases)	5
Typhlitis (one case) and mesenteric lymphadenitis (one case)	2
Postanal dermoid cyst	1
Imperforate anus and rectovaginal fistula	2
Imperforate anus with colostomy	1
Miscellaneous conditions	15
 Total	 527

In Table 1 are recorded 353 cases of carcinoma and twenty-three cases of carcinoma complicated by fistula, diverticulitis or polyposis. If to these is added one case of lymphosarcoma and four cases of epithelioma, the total number of cases of malignancy of the large bowel is 381. This high percentage of malignancy in an organ not readily amenable to surgical extirpation for various reasons, both anatomic and physiologic, is an unfortunate situation from the

standpoint of mortality. Because the majority of the lesions are malignant, almost no favorable cases are left with which to "dilute" the mortality.

The distribution of the carcinomas is not emphasized, but the majority of the lesions were in the left side of the colon, and here a departure has been made from the usual two-stage operation in many instances. It has been the policy to treat as many of these patients at one operation as good judgment would permit, and the reduction of mortality seems to bear out the wisdom of this procedure. I call attention particularly to the twenty cases of diverticulitis, because of the smallness of the number. In four of these cases the condition was complicated by the formation of fistula, and this small group of twenty cases out of the huge group of cases of diverticulosis indicates pointedly that the tendency to apply surgical measures to diverticulitis is rapidly undergoing changes and that in this clinic, if operation is to be done, diverticulitis must either be localized to one segment of the bowel or some complicating factor, which demands surgical intervention, must be present. Polyposis is probably one of the most unfortunate conditions which confronts the surgeon who is called on to treat lesions of the colon, because of its decided tendency to be a diffuse condition, involving the whole large bowel and, what is more important, because it is associated with malignancy in about 40 to 50 per cent of the cases. Within the last year, I have seen a patient with two distinct types of malignant lesion of the colon, and experience indicates that true polyposis or multiple adenomatosis, more especially, is a precursor of malignant disease. The patients in these cases usually are young persons, I am becoming more and more convinced that we are justified in submitting them to a radical procedure, such as total colectomy, because of the very fact that carcinoma is an almost invariable sequel. Multiple polyps, or isolated, pedunculated adenomas of the large bowel, should not be confused with polyposis, but when the polyps are numerous, one gains nothing by removing them one at a time or several at a time, because there are always a number left, and segmental or total colectomy is indicated, depending on the diffuseness of the condition. In Table 1, also, are recorded fifteen cases of fecal fistula. That is a particularly large number when one realizes that most fecal fistulas are the result of append-

diceal abscesses, and that the patients who come to the clinic usually have complicating conditions and have had one or two operations before. The last few lines of Table 1 are given over to miscellaneous conditions, none of which is numerous, and all of which are more or less interesting because of their rarity.

Tables 2, 3 and 4 deal with the operations on the colon and ileum. The division into three segments, the first of which comprises the ileum, caecum, ascending colon and hepatic flexure, the second, the transverse colon, splenic flexure, descending colon and sigmoid, and the third, the rectosigmoid and rectum, is an arbitrary division of my own. I think they are natural divisions because they are more embryologically correct than the numerous anatomic segments into which it is customary to divide the large bowel. The colon, rectum, and up to the middle of the transverse colon, are derivatives of the hindgut, from this point around to the point in the duodenum where the common bile-duct and pancreatic duct empty, the large and small bowel are derived from the midgut. Functionally, the left half of the colon differs from the right and on these anatomic and physiologic differences rest many questions of selection of operation as well as types of pathologic change found in the colon and rectum. Even the symptoms are influenced by the situation of a growth, depending on the question of physiologic disturbances or intestinal obstruction.

In Table 2 are recorded seven cases of resection of the ileum, five of which were for malignancy. The operation performed as a routine was resection with aseptic anastomosis over a special clamp. There were two deaths in this group. The right half of the colon, around to its juncture with its fellow of the opposite side in the middle of the transverse segment, has been attacked in multiple stages, the first of which is ileocolostomy between the terminal portion of the ileum and the transverse colon at about its middle. There were thirty-five cases in which resection of the right half of the colon for carcinoma or hyperplastic tuberculosis was done. I think it has been definitely demonstrated that the end-to-side anastomosis, implanting the cut ileum into the transverse colon, is the method of choice in making the first stage of this graded procedure. I have done this as a routine over my clamp and have not had leakage or peritonitis develop from this stage of the operation.

TABLE 2

*Operations on first segment of colon  
(ileum, cæcum, ascending colon and hepatic flexure)*

	Operations	Deaths
Resection of ileum	7	2
Resection of ileum, end-to-end anastomosis, enterostomy	1	0
Resection of right side of colon (ileocolostomy previously or at same operation)	16	3
Resection of right side of colon and aseptic anastomosis (two-stage operation, eight cases)	16	2
Resection right side of colon and aseptic anastomosis (one-stage operation)	2	0
Second stage of resection and aseptic anastomosis (resection)	1	0
First stage of Mikulicz operation	1	1
Ileocolostomy (nine of aseptic type with two deaths)	29	4
Ileo-ileostomy	2	0
Ileostomy	2	0
Ileosigmoidostomy with exclusion of colon from intestinal canal	1	0
Enterostomy	2	1
Plastic operation on ileocolostomy	1	0
Closure of cecostomy opening	1	0
Excision of fistulous tract, ileosigmoidostomy	1	0
Closure of fecal fistula, ileosigmoidostomy	1	0
Plastic operation on ileum for intermittent intestinal obstruction	2	0
Abdominal exploration (in three cases separation of adhesions also)	15	0
Abdominal exploration, cecostomy	1	0
Repair of fecal fistula	12	1
Plastic operation for prolapse of cæcum	4	0
Separation of adhesions (eighteen operations) and Lane's kink (sixteen operations)	34	0
Miscellaneous operations	8	0
<b>Totals</b>	<b>160</b>	<b>14 *</b>

\* (8.7 per cent.)

in the last year I think its advantages over the lateral anastomosis are obvious It completely sidetracks the fecal current and by this diversion permits subsidence of an inflammatory process, and although this stage of the operation is prolonged by the few minutes necessary to turn in the cecal end of the ileum, this time is gained at the second operation because removal of the segment and inversion of the distal colonic end is all that is left to be done I think that this particular operation demonstrated satisfactorily the advantages of aseptic anastomosis and particularly of this method of implantation, end-to-side The instances of ileostomy which are here recorded were for intractable ulcerative colitis, and there were

only two, as may be noted in the table. The treatment of ulcerative colitis has been allotted to the medical department and its routine treatment with Bargen's vaccine, by eradication of foci, and by dietary measures, has resulted in such gratifying end-results that operation has been abandoned in all cases except as a remote hope. With 160 operations on this first segment of the colon and ileum, there have been fourteen deaths, a mortality rate of 8.7 per cent.

TABLE 3

*Operations on second segment of colon  
(transverse colon, splenic flexure, descending colon and sigmoid)*

	Operations	Deaths
Anterior resection (colostomy previously or at same operation)	2	1
Colectomy	1	0
Combined abdominoperineal resection and colostomy (one stage)	1	0
Combined abdominoperineal resection (first stage of operation)	1	1
Combined abdominoperineal resection (colostomy previously)	2	2
Combined abdominoperineal resection and colostomy (two stages, two cases)	4	0
Mikulicz operation, first and second stages	36	3
Closure of colostomy opening	40	0
Obstructive resection	30	2
Resection and aseptic anastomosis	1	0
Second stage of resection and aseptic anastomosis (resection)	1	0
Resection of sigmoid (colostomy previously or at same operation)	4	1
Resection of splenic flexure	1	0
Cecostomy	4	0
Closure of cecostomy opening	2	0
Colostomy (in one case appendicostomy also)	38	2
Plastic operation on colostomy opening (five cases)	6	0
Cecosigmoidostomy	1	0
Ileosigmoidostomy	2	0
Ileostomy	6	3
Ileocolostomy	2	0
Enterostomy	1	0
Repair of fecal fistula	10	1
Abdominal exploration (one patient also had dilatation of stricture)	18	1
Miscellaneous operations	13	0
<b>Totals</b>	<b>227</b>	<b>17 *</b>

\* (7.4 per cent.)

Table 3, in which are recorded operations on the distal part of the colon and the sigmoid, discloses a change in policy toward the treatment of malignancy in this particular situation in the large bowel. The one colectomy which is recorded was done for polyposis,

and the result was recovery. The combined abdominoperineal resections, in one or two stages, were done for low sigmoidal growths. I think this is the type of procedure which will be chosen in many cases in contradistinction to anastomosis, and yet I am not at all sure that in many of these growths in the lower portion of the sigmoid, without lymphatic involvement, one is not justified in doing an anastomosis following colostomy. Every patient with a carcinoma of the bowel is particularly anxious to preserve the rectal sphincter, and it is obvious that a certain number of growths in the lower segment of the sigmoid may be treated in this manner. The combined abdominoperineal resection, however, was done in this group of cases because of special reasons in each case. There were thirty-six Mikulicz operations, first and second stage, with three deaths. This is a marked decrease in use of the Mikulicz procedure in The Mayo Clinic, as it has been largely supplanted, and completely supplanted so far as my service is concerned, by the so-called obstructive resection, which I did in thirty instances last year, with two deaths. I began using this particular operation in December, 1928, and did thirty-one consecutive operations with one death. This operation combines the satisfactory fundamental principle of the Mikulicz procedure, namely, exteriorization without incision of the lumen of the bowel. It avoids the unhappy complication of direct transplantation of carcinomatous cells into the surface of a cut wound. It avoids, also, another fault which the Mikulicz procedure entails, a higher mortality than other types of resection. I think it is not generally recognized that the Mikulicz operation does carry a high mortality, but in our hands it has had a higher mortality than other types of resection, save only primary anastomosis. When this high mortality rate is considered, in addition to the undesirable transplantation of cells into the surface of a cut wound, with resulting recurrence in the abdominal wall, and the lack of radical resection of gland-bearing tissues in the immediate vicinity of the growth, which all radical operations should include, I am convinced that the obstructive type of resection is much more desirable. However, I think its application should be strictly limited to growths which are nonobstructive or which have been rendered nonobstructive by preoperative preparation or, on the other hand, if slight obstruction is present and it is decided to do an

obstructive operation, decompression of the colon by cecostomy or enterostomy should supplement it. On this particular segment of the colon, 227 operations were done with seventeen deaths, a mortality rate of 7.4 per cent. This rate is less than that of mortality from operations on the right segment of the large bowel.

The third segment, namely, the rectosigmoid and rectum (Table 4), represents a more hazardous surgical field, probably because it has been attempted to extend the limit of operability and cases which were far advanced have been attacked. I have elected to do these anterior resections with few exceptions, and the combined abdominoperineal resections, which bear the high mortality in this segment. I have a firm conviction that there are so many fundamental differences between carcinoma of the rectosigmoid and carcinoma of the rectum proper that the same type of operation is not applicable to both, and that carcinoma of the rectosigmoid is probably best approached by a combined abdominoperineal procedure in one stage in selected cases. This is a formidable operation and is not to be

TABLE 4  
*Operations on third segment of colon  
(rectosigmoid and rectum)*

	Operations	Deaths
Anterior resection (colostomy previously or at same operation)	8	3
Anterior resection and aseptic anastomosis	1	0
Combined abdominoperineal resection		
Complete resection and colostomy (one operation)	12	2
Complete resection (colostomy previously)	1	0
Resection in two stages	15	4
Posterior resection	105	10
First stage of Mikulicz operation	1	1
Colostomy	184	13
Ileostomy	1	0
Closure of colostomy opening	4	0
Plastic operation on colostomy opening (ten cases)	11	0
Exploration, abdominal	7	1
Rectal prolapse (Moscheowitz' operation)	3	0
Excision of postanal dermoid cyst	1	0
Excision of growth (carcinoma) of rectum with cautery	2	0
Excision of rectal polyp (carcinomatous)	1	0
Excision of rectal polyp (adenomatous)	1	0
Excision of growth (tuberculous) of rectum	1	0
Miscellaneous operations	9	0
 Totals	 368	 34 *

\* (0.2 per cent.)

undertaken lightly or in dehydrated and debilitated patients. Obstruction must be removed before resection, rehabilitation must be instituted and cases selected for this operation must include only the better risks. By radical combined abdominoperineal operation in one or two stages, wide removal of tissue is accomplished, and although mortality is bound to be higher, I feel that end-results will justify it if good judgment is used in selection of cases to be submitted to this procedure.

Posterior resection following colostomy continues to be the operation of choice for rectal growths and probably will continue so in the majority of instances. These patients come to the clinic in a far-advanced stage of disease, and many of them are unfit for anything but palliative procedures or, at best, graded operations of as small magnitude as one can undertake. There were 105 posterior resections with ten deaths, a mortality rate of between 9 and 10 per cent. This is a little higher than in former years. Ordinarily, the mortality rate has been less than 5 per cent following this operation. However, this again is an indication that we are extending the operability and are taking more advanced and more serious cases for operation. Ileostomy was done once for ulcerative colitis.

I want to call attention especially to the three operations of the Moschcowitz type for rectal prolapse. These were all in elderly patients with extensive prolapse which was unapproachable by ordinary external means, and rather than do rectal resection, I chose to open the abdomen and obliterate the pelvis after the method of Moschcowitz. In each case the result was gratifying. I believe this is one operation which, when its indication is recognized, is about as satisfactory as any in surgery.

On this third segment 368 operations were done, with thirty-four deaths, a mortality rate of 9.2 per cent, a higher rate than in the other two segments of the colon. The mortality rate in this segment is not likely to be constant, individual factors and circumstances combine to make it higher one year than another. It should be possible to keep the mortality rate of operations on this segment easily around 5 per cent. in most years.

If the three segments are taken together it will be seen that a

total of 755 operations were done, with sixty-five deaths (8.6 per cent)

TABLE 5  
*Use of intraperitoneal vaccin*

	Cases	Deaths Caused from Peritonitis
Resection preceded by intraperitoneal vaccin	176	12 ( 6.8 per cent )
Resection not preceded by intraperitoneal vaccin	69	7 ( 10.1 per cent )
Totals	245	19 ( 7.8 per cent )

Surgical Procedure	Deaths in Cases with Preoperative Treatment with Vaccin		Deaths in Cases without Preoperative Treatment with Vaccin	
	Total	Peritonitis	Total	Peritonitis
Resection	25	12	13	7
Colostomy	5	2	10	1
Ileocolostomy	4	3	0	0
Enterostomy	1	0	0	0
Closure of fecal fistula	1	0	1	0
Ileostomy	0	0	3	2
Abdominal exploration	0	0	2	0
Totals	36	17	29	10

In Table 5 is recorded the number of patients who received intraperitoneal vaccin, preliminary to laparotomy for exploration or resection. This group is compared with another in which, for some individual reason or idiosyncrasy of the surgeon, vaccin was not used. One hundred seventy-six patients who underwent resection received vaccin preoperatively. Of this group, twelve died from peritonitis, a mortality rate of 6.8 per cent. Sixty-nine patients who underwent resection (a group approximately one-third as large as the vaccinated group), did not receive vaccin. Seven of these died from peritonitis—a mortality rate of 10.1 per cent—which is an unfavorable rate in comparison to that in the larger series of vaccinated patients. Of the total number of patients who died from peritonitis in the whole series, seventeen had received vaccin preoperatively, of these, twelve underwent resection. Ten had received vaccin preoperatively, of these, seven underwent resection. However, the twelve came in the group of 176 which was three times as large as that of sixty-nine which included the seven

In the preliminary report on intraperitoneal vaccination by mixed vaccine of colon bacillus and streptococcus, in 1928, Bargen and I reported sixty cases in which operation was done between June and November of that year and in which vaccine had been used. The mortality rate in this group was only 5 per cent, whereas the mortality rate in a control group of sixty cases, with identical lesions, was around 23 per cent. This reduction of 18 per cent, although certainly not entirely due to the vaccine, urges its continued use as one of a series of preliminary measures useful in reduction of mortality in surgery of the colon.

TABLE 6

*Grading of 216 malignant growths of the ileum, colon and rectum*

	Cases
Carcinoma	
Grade 1	16
Grade 2	132
Grade 3	53
Grade 4	10
Total number subjected to resection for carcinoma	<hr/> 211
Epithelioma	
Grade 3	3
Grade 4	1
Total number subjected to resection for epithelioma	<hr/> 4
Lymphosarcoma	
Grade 3	1
Total	<hr/> 216

Table 6 shows the grading of malignant growths according to Broders' classification of malignancy. It has been a custom in the clinic, in the last two years, to do a biopsy on all patients with rectal carcinoma who present themselves for diagnosis and it is felt that not only have we gathered some important information therefrom, but also that the question of the use of radium or radical operation is markedly influenced by the intensity of the malignancy. Some self-constituted authority, decades ago, inveighed against biopsy in malignancy of any portion of the body. Although I readily agree that biopsy, for example, from a tumor of the breast, is unwise except at the operating table, I think it is equally as unsound

to be dogmatic against biopsy of carcinomas of the rectum. If this is done with a sharp knife, through the proctoscope, and the portion of the growth from which the specimen is taken is immediately touched with cautery, I am confident that no harm is done. At least, there is no evidence to the contrary, mere statements notwithstanding. It is difficult for me to conceive how biopsy and immediate cauterization could be more harmful than the constant daily passage of the hard, inspissated fecal column over an ulcerating area. The grading shows that the vast majority of carcinomas fortunately fall into grade 2. I think we have learned that malignancy of the colon and rectum, graded 1 and 2, is more satisfactorily treated by operation and that of grades 3 and 4 by radium unless there is some particular reason for reversing this sequence.

TABLE 7

*Causes of inoperability of malignant growths as determined at the time of exploration or palliative operation*

Operation	Cases	Deaths
Hepatic metastasis	28	3 (10.7 per cent)
Hepatic metastasis and lymphatic involvement	4	0
Metastasis and local fixation	10	0
Lymphatic involvement	8	0
Lymphatic involvement and local fixation	3	0
Local fixation	42	2 (4.7 per cent)
Abdominal metastasis	4	0
Inoperable growths on account of extreme risk due to debilitation, and so forth	15	0
Totals	114	5 (4.3 per cent)

Table 7 shows the causes of inoperability of growths in the rectum and colon as determined at the time of exploration or palliative operation. The reason why most of the inoperable lesions were not resected, of course, is hepatic implantation or local fixation.

I have included Table 8 because I think it is important to recognize the percentage of operable cases as opposed to the inoperable, when the whole series is considered. Of the 381 cases of malignant lesions of the ileum, large bowel and rectum, 221 growths were resected, an operability of 58 per cent, for malignant lesions alone. The operability, of course, is higher if some of the other ailments in which extirpation is required are included. Fifty-eight per cent, however, is a very satisfactory operability and, I think,

TABLE 8	
<i>Operability and mortality</i>	
Operation for malignant lesions	Cases 381
Resection for malignant lesions	221 (58 per cent.)
Resection for all lesions (including malignant)	245
Such procedures as excision and preliminary colostomy and ileocolostomy for malignant lesions (not classi- fied as either resection or inoperability)	46

Patients operated on for chronic lesions, 527 with 65 deaths (12.3 per cent)  
Operations performed for chronic lesions, 755 with 65 deaths (8.6 per cent)

is probably as high as can be hoped for until very marked advance in recognizing early carcinoma of the colon is developed. The mortality statistics are in inverse ratio to the statistics of operability. High operability means low mortality, whereas the reverse rapidly becomes true as the horizon of operability is increased. Here many factors enter into the consideration of the individual case, not only the patient's condition, but the surgeon's personality, courage and judgment. I have a distinct feeling that until some more satisfactory treatment of carcinoma is developed in surgical extirpation, operability should be extended even at the sacrifice of statistics of mortality. Certainly, one loses little and perhaps gains much if a questionable growth is extirpated, even unsuccessfully. I have put down the mortality figures here, by case and by operation, to avoid any criticism of "window dressing." By operation, the mortality rate of 8.6 per cent is most satisfactory. By patient, sixty-five

TABLE 9  
*Causes of death*

	Cases
Peritonitis	27
Pneumonia	13
Cellulitis	4
Shock*	3
Embolism and infarction	8
Abscesses of lungs and liver	4
Toxemia	1
Coronary sclerosis	2
Postoperative psychosis (suicide)	1
Fecal fistula	1
Inanition, ileostomy	1
<hr/>	
Total	65

deaths in a series of 527 cases, a mortality rate of a little more than 12 per cent, is equally satisfactory, and although reduction of both figures is heartily to be desired, it is perfectly obvious that in dealing with potentially lethal lesions of the large bowel, one may not consider mortality statistics in judging what shall or shall not be done for a patient

Table 9 shows the causes of death in the sixty-five cases in which the patients died in this series. Peritonitis was responsible for twenty-seven deaths of the total number. Pneumonia was second as a cause of death.

#### SUMMARY

The important points in this report, I think, are the satisfactory establishment of cooperative preoperative management and the steady tendency to emphasize certain fundamental principles concerned with the two halves of the colon. Unquestionably these have led to reduction of mortality without limiting the scope of operability or sacrificing a presentable death rate of patients in hospital.

The cooperative management between internist and surgeon, which aims at reduction of obstruction, rehabilitation by combating anemia and dehydration, and immunization against peritoneal contamination by the use of an intraperitoneal vaccine, has, I believe, proved itself of extreme value. Whether any one of these steps would be as efficacious as the combination of them, I doubt, but without question, measures which reduce obstruction and increase general resistance are advantageous and tend to produce successful end-results in any field of colonic surgery.

The statistics of mortality must vary from year to year and perhaps one is overenthusiastic and optimistic who expects a radical reduction of this year's figures. I feel confident that a great reduction in operative mortality over that quoted means' narrowing of the horizon of operability, and until more adequate therapeutic agents than surgery offer greater opportunities for cure or palliation to sufferers from carcinoma, one is, I am convinced, justified in attempting radical extirpation in all cases up to, and frequently including, those of borderline operability. Certainly no surgeon familiar with the outcome of cases of carcinoma would wish otherwise for himself.

## INFLAMMATORY DISEASES OF THE LARGE INTESTINE\*

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THE three most common chronic infections of the large intestine prevalent in the north temperate zone are bacterial chronic ulcerative colitis, tuberculous colitis, and parasitic infections of which the most common is amebic colitis. Other conditions are found, but for practical purposes they need to be considered only in differential study of these three, and not often from the standpoint of active therapeutic measures. It is my purpose to consider these diseases from the standpoint of diagnosis, both individually and differentially. Also, I wish to bring before you their etiologic factors, and, finally, to review past therapeutic measures and to suggest measures used at present, which, to my mind, are more rational.

### DIAGNOSIS

As in many other serious bodily ailments, the correct diagnosis is the key to successful treatment and ultimate prognosis. The three inflammatory conditions mentioned have definite distinguishing diagnostic features from one another, as well as from other lesions of the intestine. The history of these cases is always suggestive of the nature of the underlying pathologic process. A history, dating back several months, of recurrent and intermittent attacks of bloody, purulent, rectal discharges, with day and night frequency about equal, gradual, progressive, general depletion, and finally chronic invalidism, possibly lasting for years, indicates chronic ulcerative colitis. Progressive diarrhea, with gradual appearance of little, if any, blood, with occasional periods of constipation in the presence of pulmonary disease, and usually with a relatively short history, is suggestive of intestinal tuberculosis. Severe, recurrent attacks of diarrhea, with or without blood, with a tendency to more stools in

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the daytime than at night, and periods of complete remission, suggest parasitic disease

The diagnosis cannot be established by anamnesis. The three important guides to differentiation of ulcerative lesions of the large intestine are the gross and microscopic analysis of stools or rectal discharges, proctoscopy, and roentgenoscopy.

In chronic ulcerative colitis there is a characteristic rectal discharge, consisting predominantly of pus, mixed or streaked with blood and mucus, or there may be large clots of blood, and rectal gushes of liquid, bloody material. The stool may be mixed with these discharges as their lesser portion or, as in the cases in which only the distal portion of the intestine is involved, the stool may consist of scybala masses discharged separately from the purulent material, or mixed with it and passed with some difficulty. Microscopically a vast predominance of polymorphonuclear leukocytes, and of streptococcus forms of bacteria will be found.

The proctoscopic picture has been well described by Buie, and in chronic ulcerative colitis the proctoscope gives the most positive diagnostic data. The easily bleeding, granular, diffusely inflamed mucous membrane is characteristic. Diffuse involvement is pathognomonic. There is no place in the mucosa which is not affected. Early, there is seen hyperemia and edema, then milia abscesses are followed by milia ulcers. Later, by pressure necrosis or confluence of ulcers, the larger, so-called secondary ulcers develop. The diffuse involvement does not include only the mucosa, but rather the entire wall of that portion of the large intestine which is involved in the inflammatory process. This, then, readily explains the roentgenologic picture. A diffusely narrowed, foreshortened, nonhaemorrhaged colon results.

Although chronic ulcerative colitis usually begins in the rectum and spreads toward the more proximal portions of the colon, it may, on first observation, affect any portion or all of the large intestine.<sup>3</sup> Occasionally, in this way, a regional or migratory type of involvement takes place, and the roentgenographic appearance is so irregular that, at times, it is difficult to distinguish from a roentgenogram taken in a case of tuberculosis or extensive malignant disease. However, other clinical data, with rare exceptions, clarify the situation.

The stool of a patient with ulcerative intestinal tuberculosis, even

when involvement includes the rectum, is rarely bloody. Instead of the purulent bloody discharges of the patient with chronic ulcerative colitis, there are thin, watery, faecal stools. If blood is present, it is usually in barely discernible streaks or is occult. Microscopic evidence consists of much epithelial débris mixed with undigested food, and diligent search will reveal bacilli of tuberculosis. However, acid-fast bacilli alone, without other positive evidence of tuberculosis, must not be considered diagnostic, for other acid-fast organisms that have no pathogenicity may be resident in the intestine.

The proctoscope does not play as important a part in this disease as in chronic ulcerative colitis. If proctoscopic evidence is positive it is characteristic, but because of the much more common occurrence of the tuberculous ulcerative lesions in the small intestine and in the right side of the large intestine, positive proctoscopic pictures are seen in a smaller number of cases than in ulcerative colitis.

There are irregular, shaggy, deep ulcers, with undermined and overhanging edges, and between the large ulcers there may be, and usually is, normal mucous membrane. The involvement is not as diffuse, deep, nor extensive as it is in the cases of chronic ulcerative colitis, which explains the roentgenographic appearance after barium enema. There is a tendency for the roentgenographic shadow to have a smooth edge and for haustra to be obliterated, but this is not nearly so marked as it is in the cases of chronic ulcerative colitis. Furthermore, the greater involvement in tuberculosis is usually in the ileocecal coil, and if ulceration extends caudad there may be a gradual funnel-like narrowing of the colon from the left side toward the cæcum<sup>1</sup> but the shadow, instead of having a smooth edge, will have a very irregular, "feathery" edge. Writting and rapid emptying and filling of the ileocecal coil often is noted under fluoroscopic observation. In tuberculosis of the colon, roentgenographic measures are the most important diagnostic aid.

In parasitic infections, and here we are dealing mostly with amebic colitis, examination of the stools is the most valuable laboratory procedure. The stools are loose and watery, and in the active ulcerative stages may contain much mucus and fresh blood. Microscopic examination of emissions and finding of large numbers of *Endameba histolytica* is more than presumptive evidence for a correct diagnosis. There are rare exceptions, such as the 5 per cent of

patients with chronic ulcerative colitis who are carriers of amebae, but in most patients whose stools contain *Endameba histolytica* intestinal symptoms are caused by them.

If, in addition, the typical proctoscopic picture is seen, the diagnosis is established. Amebic intestinal ulcers are disseminated, have a punched-out appearance, perhaps are covered by a fleck of mucoid material, and have a hyperemic, surrounding zone of mucosa, but between the ulcers will usually be found mucous membrane which appears fairly normal.<sup>4</sup>

The roentgenogram, except in the more severe cases, offers little help. In the more severe and extensive cases of amebic ulcerative colitis, fluoroscopic evidence of irritability will be noted. As in the cases of tuberculous colitis, the more severe involvement is on the right side, smaller defects may appear here when no evidence of trouble is seen elsewhere in the colon.

All these inflammatory diseases have distinguishing characteristics, yet their distinction from other intestinal diseases, in which bleeding takes place, is not always easy.

One of the conditions which is of an inflammatory nature is diverticulitis, but its occurrence depends on the presence of diverticulosis which is noninflammatory. In rare instances, there is associated bleeding, but by the history and roentgenogram, and occasionally by the proctoscope, the diagnosis is readily established.

Benign rectal stricture, of inflammatory or traumatic nature, frequently is difficult to distinguish from the diseases that have been mentioned, and particularly from chronic ulcerative colitis. Secondary rectal stricture may follow long-standing chronic ulcerative colitis. The proctoscope gives the most accurate evidence of the nature of rectal strictures. Syphilitic rectal strictures occur, there is, also, a traumatic type, and a group definitely due to the irregular contracture of chronic ulcerative colitis. In addition to these, there is a group in which there is marked rectal stricture with ulceration without evidence of old or recent disease above or below the stricture. The etiology of these strictures is problematic and they are difficult to place in a differential diagnostic scheme.

Polyposis of the large intestine offers another serious differential problem. Most diffuse polypoid disease is on a basis of chronic ulcerative colitis, but there is another type of adolescent or congeni-

tal polyposis in which proctoscope, Roentgen-rays, and sometimes biopsy, will be needed to clear up the diagnosis. Barium enema, followed by application of roentgenologic methods of diagnosis, is not entirely satisfactory for a study of these cases, for in certain positions the numerous small defects will not be visible, either fluoroscopically or on the plate. For this reason, Fischer<sup>5</sup> advocated injection of air by rectum, followed by examination of flat plates.

Finally, in any case of rectal bleeding the possibility of malignant disease must be entertained. Early diagnosis in these cases is a most important therapeutic requirement. Too often, the occurrence of rectal bleeding is dismissed without careful investigation. This means, again, employment of the three diagnostic aids. Often digital examination alone will suffice for presumptive diagnosis, but more frequently the proctoscope is needed in lesions below the sigmoid, and roentgenograms after barium enema are necessary for defects in the remainder of the large intestine.

#### ETIOLOGY

Recent studies of causative factors of chronic ulcerative colitis seem to place bacteria foremost. Six years ago, some experimental work suggested that a diplostreptococcus probably had a causative relationship to the disease. In due time, other workers offered confirmatory evidence and a review of etiologic studies has been reported.<sup>2</sup> Since the latter report, Horgan and Horgan,<sup>7</sup> Streicher and Kaplan,<sup>8</sup> and Fradkin and Gray<sup>9</sup> have advanced further evidence of the etiologic significance of such a diplostreptococcus.

I have not felt that the diplostreptococcus was the sole instigator of the disease but probably one of primary importance. Later studies have suggested the possible significance of mutation forms of this organism, or of a closely related group of streptococci that seems to be significant in the etiology of chronic ulcerative colitis. Work along this line will be reported in a future publication.

Little needs to be added on the etiology of intestinal tuberculosis. A word of caution might serve. The presence of acid-fast bacilli is not diagnostic of tuberculosis of the intestine. First, a very large proportion of patients with open pulmonary tuberculosis expel acid-fast bacilli in the stools; second, acid-fast bacilli may not be found in the stools in ulcerative tuberculosis, and, finally, other acid-fast

bacilli are occasionally found in the stools. However, given an ulcerative lesion of the large intestine roentgenologically like the generally accepted picture of tuberculosis and acid-fast bacilli in the stools, in the absence of pulmonary signs, the lesion is probably tuberculous.

*Endameba histolytica* is the parasite of amebic dysentery. *Endameba coli* and *Endolimax nana* are at times confused with the *Endameba histolytica*, but in the hands of an expert parasitologist there is little justification for this. It seems generally agreed that *Endameba coli* and *Endolimax nana* rarely, if ever, cause trouble. However, there are cases in which only they are found, and the patients have diarrhea, and with the institution of adequate treatment the symptoms subside.

#### TREATMENT

The first phase in the recent treatment of chronic ulcerative colitis has been mainly the combating of the diplostreptococcus. For the less severe cases, treatment with vaccine prepared from the diplostreptococcus administered subcutaneously has given encouraging results. More recently, for the severer, more depleted, or acutely ill patients an antibody solution prepared by a simple method of concentrating the immune chronic ulcerative colitis serum has yielded striking changes for the better in many cases. The antibody solution has been administered deep in the muscles, twice a day, beginning with small doses, and rapidly increasing their volume. As soon as definite improvement results, gradual substitution of the autogenous vaccine for the antibody solution is made and treatment with the latter is continued in accordance with the patient's progress. It is difficult to comment on "cure" of chronic ulcerative colitis. One thinks more of control of the disease, but by virtue of the fact that the number of controlled cases mounts annually and that some have now gone five years without a return of symptoms, it seems as if the present form of treatment offers a hopeful outlet for future therapeutic endeavors.

The second, and probably, also, very important phase of the treatment is removal of distant foci of infection. Striking immediate improvement, as well as much less liability to recurrence, has followed removal of infected tonsils and teeth.

The third important phase of the treatment of cases of chronic ulcerative colitis is dietary regulation. As in any chronic depleting form of invalidism, a large variety of easily assimilated foods of high-calorie value are indicated. In just what order, and with what rapidity and urgency the various foods should be offered, is a matter of individual taste. In the less depleted patients, and those who have the disease in a milder form, urging them to eat usually suffices. As cases of greater severity are encountered, the problem of feeding often becomes the most serious one with which the physician has to deal. Patients who have had chronic ulcerative colitis for a long time probably are among the most difficult of all patients to feed. They often have lent ear to many food fads and fancies, or they have been advised not to eat this or that, but more important than all of these, they have no appetite. Here the well-trained dietitian often can be of great help.

Many of the patients with chronic ulcerative colitis who come to the clinic are ambulatory, but for those whom it has seemed necessary to place in hospital, the following dietary regimen has served well. Feeding is begun with a basic diet of 2,000 calories. It is a graded diet, with periodic increases in foods of various types, so that in the case in which there is average response to treatment, by the twentieth day a full tray containing 3,000 calories of food is served. At the outset, the intake of protein is sixty grams, by the twentieth day, it is eighty grams. The diet at the beginning is bland, and meat is given from the first. Purée of vegetables is added the seventh day. Milk is added the tenth day. Frequently patients complain of more gas when taking milk, so that it is not included in the basic diet. Cooked fruits are added the thirteenth day. Whole vegetables are substituted for purée of vegetables the seventeenth day. Of course, these are adapted to the case. Cabbage, other stringy vegetables, and seedy fruits are inadvisable. Only a few of the articles of diet have been mentioned here. Other generally accepted foods are given in generous quantities. An effort has been made to mention those foods concerning which there might be some question. Occasionally an acute case or a complication will demand discontinuance of all feeding by mouth. The important thing to remember is that an organ far from the site of the major digestive actions, and a severe infectious disease, are being treated.

Finally, supportive measures, including opiates, one of the powders, occasionally abdominal stupe, hemostatics, tincture of iodin by mouth, and other simple measures, seem to have helped in individual cases

Surgical interference should be confined to treatment of complications or of that small number of cases which resist medical treatment

The treatment of intestinal tuberculosis divides itself readily into surgical and medical. For the localized hyperplastic types, surgical resection seems the treatment of choice. For the extensive ulcerative lesions, the usual tuberculous regimen may be carried out, including careful dietary regulation, rest and sun-baths. The treatment is far from satisfactory, for one is dealing here, usually, with a late complication of pulmonary tuberculosis.

Of all ulcerative lesions of the large intestine the most satisfactory from the standpoint of treatment are those caused by amebiasis. From the comparatively recent use of ipecac by mouth and enemas of coal oil, has developed the simple regimen of emetin hydrochlorid hypodermically and arsenic in the form of stovarsol or treparsol by mouth. Yatren (anayodin) occasionally has found favor. Bismuth-emetin-iodin has helped in selected cases, but the spectacular and lasting results which occur so commonly after the administration of emetin hydrochlorid and treparsol make these the drugs of choice.

#### SUMMARY

The three most common, as well as most serious, infections of the large intestine are chronic ulcerative colitis, amebic ulceration, and tuberculosis.

The treatment of the first two is fairly well standardized. It is primarily medical. The treatment of the third leaves much to be desired.

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# Medical Ethics

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## CHANGES IN MEDICAL ETHICS CONCOMITANT WITH CHANGES IN SOCIAL CONDITIONS \*

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### INSTRUCTION IN MEDICAL ETHICS

THOUGH it is just as important today as ever before that medical students should be familiar with the principles of medical ethics and with the forms of conduct that are approved or disapproved by the collective will of the profession, it would seem to me that the kind of instruction in medical ethics needed in the University Medical Schools of today is somewhat different from that which was appropriate in the medical schools of the older times when the educational requirements for admission were very different from what they are now.

The students of the better medical schools of today have received degrees from colleges of liberal arts before admission to the medical schools or they acquire such degrees at some time during the course of their medical studies, we may, I think, reasonably assume that the possession of such degrees connates more knowledge of the foundations of character and of the motivation of conduct than has been gained by students whose general education was limited to high-school or grammar-school training. Many of the college graduates will have had opportunity to attend lectures upon psychology, sociology, and philosophy, and, accordingly, they will scarcely have failed to imbibe some knowledge of current conceptions of character formation, of human motivations, and of the relationships of single individuals to smaller and larger social groups. They will have become familiar with the various human desires that incite conduct, will have learned the importance of harmonious all-round development of their own personalities and will have been

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taught the significance of the sensible control of human desires by reason for all higher social organization. Through both precept and example, they can scarcely have failed to become inspired with a desire for right conduct, and the majority of them will have determined to achieve a reputation for behavior that is in accord with decency and that meets with the approval of the general collective will.

In the medical schools of today, students of the pre-clinical and the clinical sciences must have revealed to them the ways in which human activities are determined. They learn the significance of constitution, on the one hand, and of environmental influences on the other, for the origin of different types of conduct, they have become acquainted with the regulative functions of the intellect (or cognitive function of the psyche) and with the driving forces that lie in the character (or affective-conative functions of the psyche). In the psychiatric clinic, especially, they have manifold opportunity of observing pathologic forms of conduct, attributable to faults of constitution, to mimical environmental circumstances, or to both. Moreover, during their four years in the medical schools, such students have been in more or less intimate contact with medical teachers and practitioners who are animated by high ethical ideals, and, as a natural consequence, they are likely to be inspired to emulation of the conduct of these exemplars when they enter upon practice for themselves.

With this educational and moral background, it would seem almost absurd to me that in a course upon medical ethics today much time should be spent in discussing the common decencies of professional behavior to which considerable attention had of necessity to be paid in the ethical instruction of earlier times. The inestimable utility of applying the golden precept of conduct, "Whatsoever ye would that men should do to you, do ye even so to them," ought to have been sufficiently ingrained in students with the background I have described to protect them from falling into the grosser errors of medical conduct that are out of accord with the several principles and codes of medical ethics that have, from time to time, been formulated with respect to the duties of the medical practitioner to himself, to his colleagues in the profession, and to the public at large. Why should we feel any necessity for talking to medical students today about these ordinary and obvious duties? It must surely

be well known to every medical graduate that it is his duty to himself to do the best possible work of which he is capable, to obtain his fair share of practice, to be justly remunerated for his toil, to attempt to gain the confidence, respect and co-operation of his patients in treatment, to guard himself against situations that would lay him open to criticism or blackmail, and to gain a reputation for the possession of character that is worthy of his training and of the noble profession of which he has become a part. In the second place, with respect to his fellow practitioners, he need scarcely be told that it is his duty to abstain from slandering them and from making remarks that reflect upon their ability, that he should avoid unfair methods of self-advertisement, that he should refrain from stealing the patients of other doctors, that he should squelch any feeling of jealousy arising in himself on observing the success of his competitors, or that he should give no real cause through unseemly behavior for the excitation of jealousy among his colleagues, that he should bring aid and succor to his fellow practitioner who may be ill or in distress, that he should encourage the fair remuneration of all workers in his profession, or that he should do everything in his power to preserve the honor and the legitimate interests of the medical fraternity as a whole. And, in the third place, with respect to his duties to his patients and to the public at large, it would seem scarcely necessary to exhort him faithfully to fulfill his obligations to maintain their health and vigor, to cure and to ameliorate their maladies, to avoid the making of exorbitant charges for professional services, to refrain from the abuse of confidences and of intimate relations established, to condemn any violation of professional secrecy, to abhor the taking of commissions or the deception of patients by the division of fees, to give the necessary professional care to the poor as well as to the well-to-do (making sure that any fees charged a patient are never a hardship), to put freely at the disposal of his colleagues his own knowledge and experience and any discoveries that he may make for the general good of the public, to do everything in his power to increase professional knowledge and skill, to do his part in the education of the public with regard to the dangers of practice by unqualified practitioners or to do his fair share in the support of all agencies that attempt wisely to provide for the improvement of public health. For these general principles of medical

ethics must necessarily appeal strongly to the moral consciousness of every decent and well-educated medical man

There are, it is true, certain details of medical etiquette that have gradually emerged as corollaries to the general principles just mentioned and with these, too, every fledgling graduate should become acquainted I refer to certain rules of manners that have received the sanction of professional custom and sentiment They have to do with the privilege of a patient to change his medical attendant, with the making of friendly visits to patients under the care of other medical men, with the subtler forms of self-advertisement, with certain particularities relative to medical consultations, and with the like more It is, therefore, wise for the recent graduate to familiarize himself with the contents of the little pamphlet published by the American Medical Association for the guidance of practitioners in these details of medical etiquette

For every profession, be it medicine, law, journalism, or what not, there are certain general principles of conduct and certain rules of manners that have been found to be advantageous both for the particular profession and for the public Every medical graduate should be proud of the high standard of morals and of manners that his forerunners have set up, and every new member of the profession should be glad to adopt the principles and to conform to the rules that have been designed to prevent unscrupulous persons from acting unjustly toward their fellows and from turning unfairly to their own advantage the ills or the credulity of patients

#### ON THE EMERGENCE OF NEW ETHICAL PROBLEMS AS SOCIAL ORGANIZATION ADVANCES

May I, before going farther, direct your attention to some of the books with which anyone interested in modern views of ethics and of general ethical problems may wish to become acquainted Some of you are doubtless familiar with the exceedingly interesting book by Hastings Rashdall entitled *Theory of Good, and Evil* In that valuable treatise on moral philosophy there are excellent discussions of the ethical theories that have been held at different periods of the progress of civilization If you have read it you must have been deeply interested in the discussion of the origin of what we call "conscience" or the "moral consciousness," of the nature

of right conduct and of duty, of the motives or springs of conduct, of realistic and of idealistic attitudes toward conduct, and of the relationships of personal conduct to social and political organizations. If, in connection with your course on medical ethics, you should desire to renew your acquaintance with the theories of conduct in general, you can scarcely do better, I think, than to re-read Rashdall, or to consult the English translation of Paulsen's *System of Ethics*, for both of these treatises contain careful expositions of the best things that have been thought and written upon the subject. Among other valuable treatises that you may like to consult, I would mention R. C. Cabot's *Adventures on the Borderlands of Ethics*, B. Croce's *Philosophy of the Practical*, Dewey and Tuft's *Ethics*, W. Fite's *Moral Philosophy*, L. T. Hobhouse's *Morals in Evolution*, G. E. Moore's *Ethics*, H. Sidgwick's *Methods of Ethics*, E. H. Sneath's *Foundation of True Morality*, E. A. Taylor's *Problem of Conduct*, and E. A. Westermarck's *Origin and Development of the Moral Ideas*. Though none of you will have the time to wade through all these volumes, you may like to have the list at hand for consultation with regard to particular points of ethical theory.

But in any review of the general subject under consideration, do not fail to read the article by F. F. MacLennan entitled *A Functional View of Morals* and the article by James H. Tufts entitled *Individualism and American Life*, both of these interesting papers are contained in the recent volume of *Essays in Honor of John Dewey* (New York, 1929). In them you will find good discussions, first, of the view that the moralities and immoralities of men vary concomitantly in their origin, modes, and development with the social organization and life of the race, and, secondly, of the struggles between individualistic democracy, on the one hand, and socializing democracy, on the other, in our American life.

Those who adhere to the view that "moralities" and "immoralities" are functions of the social organization of human life lay great stress upon the changes in opinion as to what is moral and what is immoral that have been in evidence at different stages of the development of human culture and civilization. Anthropologists have, as you know, laid emphasis upon four main successive stages of social organization: (1) that of the kinship group, (2) that of the nation, (3) that of the sovereign individual, and (4) that of

the democratic social order. They have pointed out that the primitive social life at the stage of *kinship groups* was subject to very complex rules and regulations. Everything had to be done in a certain way, only the customary way was right and any other way was taboo. Anyone who was loyal to the group life and its customs was considered a "good" man, whereas anyone who was disloyal to these was a "bad" man. Virtue consisted in acceptance of the customs and taboos of the group as authoritative sacred rules of conduct, whereas vice consisted in non-acceptance of these rules, in disrespect for the customary folkways, and in refusal to recognize the holiness and the authority of custom and taboo. Morality was thus communal, rather than personal.

Kinship groups were succeeded by *nations* in the form of autocratic states. At this stage of development, morality consisted in loyalty to the state, to the state's sovereign, and to the institutions, laws, and ideals of the state. The functional character of morality was well illustrated by the differences in emphasis placed upon special kinds of behavior according as the temperament of the nation was cultural (as in Greece), religious (as among the Jews and Hindoos), political (as among the Romans), or industrial and commercial (as among the Carthaginians). In each case what was regarded as moral may be looked upon as a functional expression of the social order of the time and of the race. The will of the sovereign (or the will of the state) as expressed in laws, institutions, and ideals, was supreme, the will of single individuals, of kinship groups, and of professional groups, was subordinate to this higher national will.

Next came the period when in national societies every individual human being was regarded as a unit of sovereign value from the standpoint of morals, this is the stage of the *sovereign individual*. Authority rested in the last analysis upon the wills of individuals, it was a contract entered into by these individuals. Institutions were man-made and therefore revocable. Man's moral life centered in the human individual. This idea lay at the bottom of Christian ethics. "For what has a man profited, if he shall gain the whole world, and lose his own soul? Or what shall a man give in exchange for his soul?" The idea was cherished among the persecuted Scottish Covenanters, as is shown in one of the ecclesiastical sonnets

of the time "But who would force the soul, tilts with a straw against a champion cased in adamant." It was adumbrated in Henley's poem

"It matters not how straight the gate,  
How charged with punishment the scroll,  
I am the master of my fate,  
I am the captain of my soul "

Man's duty, according to moralists at this stage, was to respect himself and others, a view that led to the doctrines of "humanism" and of "human brotherhood."

But this view of the sovereignty of the single individual as regards morality and immorality was fraught with difficulties. Attempts were made, of course, to reconcile egoism with altruism, but many have maintained that these are in reality irreconcilable and that the logical trend of individualism is toward anarchism. Although the idea of the sovereignty of the individual went far toward an increase of freedom by unfastening the trammels of sex, of class, of color, of race, and of nationality, it was, nevertheless, in direct conflict with the undeniable fact that man cannot be regarded as a unit that is exclusive, since every individual human being is, willy-nilly, a member of smaller and larger social groups.

Finally, there has emerged, or is now emerging, a form of social organization known as *co-operative democracy* or *socialized democracy*. This is based upon a conception of arrangement and co-ordination of human individuals into a systematic whole, that of human society, and, during the past one hundred years, this conception has made progress by leaps and bounds. This particular idea of social organization is, however, not new. You will all recall that Aristotle, himself, declared that "Man is by nature a social animal," and that, later, Vico, the Italian jurist and philosopher, emphasized the social tie as natural and organic, society being the matrix in which individuals unfold.

Pregnant with potentialities as these ideas of a socialized democracy were, they could not be very fruitful for ethical progress until social conditions had advanced far beyond those that prevailed at the time of their enunciation. The large crop of benefits derivable from an individualistic democracy had to be reaped before a ~ ~ 'iz-

ing democracy could make much headway. Moreover, society is sensible enough to try to preserve the values and the methods of living achieved in the past even when it is striving for the realization of the potentialities of any higher and nobler social order contemplated. Even today the morality that should be concomitant with a socialized democracy is, as MacLennan has emphasized "a hope, a prophecy, a program of constructive work" rather than a morality that already exists. Among its principles are (1) the maintenance of loyalty to the common good of all sovereign individuals, and (2) the establishment of social institutions to serve this common good. Our public-school system, our churches, and the professions of medicine, law and journalism have already gone far in the direction of the development of a more socialized democracy in contrast with the more individualistic democracy that is still dominant.

MacLennan has well summarized the evidence that moralities and immoralities vary with social organization by stating that (1) the kinship group produces custom morality, (2) the autocratic state-nation produces authoritative institutional morality, (3) the democracy that stresses the sovereignty of the individual produces individualistic morality, and (4) a socialized democracy has as its ideal the production of a morality of the common good. Undoubtedly, such a division of human history into stages to which certain types of morality tend to correspond is interesting and heuristic. It must be admitted, however, that there has always been overlapping of these stages and of their moralities and immoralities. Nor can it be denied that every new ideal of morality should attempt to preserve the values and, to a certain extent, the methods of the ideals that have preceded it.

It is obviously desirable that, in the progress of social organization, radical tendencies toward reform should be combated by the tendencies of a resistant conservatism. If it were not for this continual struggle between reformers, on the one hand, and "stand-patters," on the other, human society might plunge into chaos. In general, youth is on the side of change, whereas age tends to be obstructive of change and to warn against the risk of losing the good that has been gained through premature attempts to obtain further goods that are only imaginatively visualized. Thus, in our own country today, there are but relatively few who would be

willing to exchange the status of our democracy which is as yet largely individualistic for that of Soviet Russia, which has made a revolutionary effort to be communal America, quite properly, prefers to pass very gradually from an individualistic democracy to another that is a more co-operative or more socialized form of democracy, rather than to risk the dangers attendant upon sudden and violent changes in the social order, in her opinion, attempts at impetuous reform are likely to be rash and to be productive of more harm than good During the Great War, it is true, America went far in the direction of a socialized democracy, for the government took over the railroads and controlled the distribution of food, and private individuals were ready to make very great sacrifices (including enormous numbers of youthful lives) for the welfare of the common weal But since that war there has been a strong reaction in favor of the individualistic organization of our democracy and against a too rapid evolution of a more socialized form The policy that seems to be favored just now is, "less government in business and more business in government" There has been a return to the characteristic American belief that the interests of society as a whole will, for some time yet at least, be better promoted by encouragement of the motivations of private profit and by permitting free rivalry to continue as a social mechanism of selection that will enhance the desired qualities or characteristics of a people No one will be so foolish as to deny that yearnings for self-expression and for self-realization have been very important for social progress, particularly in our country, in which educators, members of the professions, and the higher types of business men are realizing more and more the importance of the regulation and control of selfish impulses when they endanger the common good A genuine attempt is being made in America to better the conditions of all, despite the extraordinary opportunities that are offered to single members of society for the realization of their personal interests The regulation of the railroads and of our great industrial corporations, the promotion of the welfare of agriculture, the conservation of natural resources, the enactment of income-tax legislation and of legislation in the interests of the laboring classes, the voluntary support of hospitals for the poor, the arrangements for federal and state care of delinquents, defectives and insane persons,

the organization of public schools, colleges and universities supported by city and state funds, and the promotion of public health by the health services of towns, cities, states and nation are all evidences of the interest taken by our people in co-operative effort for common benefit. At the same time, the American people are unwilling to transfer the great business interests of the country that are run for private profit to the hands of the government, for they fear that this would lead to a transfer to the hands of unscrupulous politicians "who know exactly what they want" or to the hands of inept routinists who might lack both the incentive and the ability that are necessary to insure the continuance of progress.

Even the "socially minded" must admit that the experiments thus far made in the direction of the socialization of our democracy have not been wholly satisfactory. Though the passage of the income-tax amendment was undoubtedly a move in the right direction and has been productive of great good, this legislation is not devoid of imperfections, especially where the taxation of earned income is concerned. Again, the passage of the Prohibition Amendment to the Constitution, no matter how nobly conceived as a measure for the promotion of public health and safety, is believed by a large proportion of our population to have been unwise, even among those who are of the opinion that ultimately total abstinence from alcohol may be advantageous to the race, there are many who now readily admit that legislation that attempts to enforce prohibition is premature and that better results can be obtained by the continuance of campaigns of education with regard to the dangers of the abuse of alcohol, campaigns in which medical men have always actively participated. Those who strongly favor the inculcation of the ideals of a socialized democracy should realize not only the futility of, but also the positive harm done by, the enactment of any legislation that cannot gain the consent and willing support of a vast majority of the people. It is perfectly legitimate for the state to regulate personal behavior, whenever such regulation becomes obviously necessary for the general good. It is not necessary that there should be unanimous agreement with regard to what is, in reality, necessary for the general good, but experience in government has repeatedly demonstrated that attempts to standardize individual beliefs by force are likely to fail and to bring in their train

a variety of evils that every one must deplore. Before laws that restrict personal liberty of behavior are passed, there should be a great preponderance of the conviction that the degree of compulsion legislated is not only fully justified by the beneficent ends aimed at but is also demonstrably compatible with the contemporary habits and opinions of the majority of persons concerned. Things that are lawful should also be both right and expedient!

By this time, many of you will be thinking that this talk is about "ethics in general" rather than about "medical ethics." I have, however, not lost sight of the task assigned to me, indeed, all that I have hitherto said bears upon certain problems in medical ethics that seem to claim our urgent attention at this time.

#### PROBLEMS IN MEDICAL ETHICS NOW AGITATING THE MEDICAL PROFESSION AND THE PUBLIC

As I remarked at the beginning of this lecture, the general principles of medical ethics and the rules of medical conduct as formulated by the American Medical Association are, on the whole, acceptable and they are so obviously right that any prolonged discussion of them before students educated as you have been would seem to be a work of supererogation. But, as might have been expected, in a social organization that is undergoing such rapid changes as ours, new ethical problems are arising that will demand for their solution the best and deepest thought of all members of our profession and, on considering them, we should determine beforehand to be willing to subject our impulses and the driving force of our emotions to whatever conclusions such wise thought may lead.

These newer problems in medical ethics are related to the re-organization of the medical profession in accordance with the newer knowledge and skill and with the changing social conditions of our time. On the one hand, the science and the art of medicine have, during the past fifty years, made prodigious strides, through medical research a multitude of new facts has been discovered that can be applied to the diagnosis, the treatment, and the prevention of disease, and new instruments and new practical-technical procedures have been devised in almost countless numbers for such application. On the other hand, social conditions in the United States have been recently undergoing rapid and bewildering change. With the de-

velopment of industry on a large scale, machines have come more and more to take the place of men. In a capitalistic age, the small manufacturer, the small producer, and the independent artisan tend to disappear and to give place to armies of men who are employed as managers, as supervisors, as machine tenders, and as manual laborers, by great corporate organizations that require millions or billions of dollars to finance them. At the same time, the population tends more strongly to aggregate in cities and towns and to desert the rural districts. All these medical and social changes taken together have created new problems in medical organization and have demanded a reconsideration of the duties of medical men to their patients and to the public at large.

Since 1914, we have seen a reorganization of medical education with extension of the whole-time plan of service to the clinical branches in many schools. The adoption of this plan has increased activities in clinical research, has altered the economic status of the clinical teacher, has to some extent modified the character of clinical teaching, has led to a difference in relations between the teachers of clinical subjects and medical practitioners as regards consultations, and has radically transformed the relationships of the clinical professors to the public at large. That many difficult problems in medical ethics should have arisen as a result of such profound changes in the clinical departments of our medical schools and of our teaching hospitals, should not cause surprise.

Medical practice, too, has been undergoing a profound reorganization and still greater changes seem to lie immediately ahead. With the rise of specialism, there have been new successes in diagnosis and in treatment in special domains and an ever greater number of medical practitioners are coming to confine their activities to the investigation and management of disorders of single organs, or of single systems of the body, thus acquiring more extensive knowledge and greater skill in particular domains than can reasonably be expected of practitioners who attempt to cover the whole clinical field. Patients hearing of the success of these specialists have been inclined to turn directly to them rather than to general practitioners for diagnosis and treatment, all too often, the specialists selected are not those suited to the needs, since a disturbance observed in a special domain may be far less important than are dis-

orders that simultaneously exist in other domains and that may be unsuspected by the patient. Naturally, the functions of general practitioners have been undergoing corresponding restriction, since many patients who formerly consulted them for all ills no longer turn to them when their maladies are surgical or when they seem to them to be "special" or "obscure." The wiser general practitioners try to keep pace with advances in diagnostic methods and in therapeutic procedures. They attempt to increase their knowledge, their skill, and their appreciation of new conditions by attendance upon post-graduate courses, and they recognize that they can no longer do everything themselves but must call to their aid the services of roentgenologists, of laboratory workers, and of various medical and surgical specialists. This increasing complexity of modern diagnosis and treatment has been responsible for the origin of so-called "group diagnosis" and "group therapy"; group clinics are being organized in which internists, medical and surgical specialists, roentgenologists, and clinical laboratory workers co-operate in the making of comprehensive diagnostic surveys in order that complete multidimensional diagnoses may be made and that suitable therapy may be planned to meet all the indications discovered through the diagnostic studies. Some of these group clinics deal chiefly with ambulatory patients, but for patients who are too ill to go about for examinations, the groups must work in hospitals in which all the facilities for diagnosis and treatment are combined under one roof. The general practitioner who does not associate himself with a group may often find himself in a serious plight.

The new methods of diagnosis and therapeutics, multiple and expensive as they are, have created difficult problems in connection with the cost of medical care. Wealthy patients have no difficulty, of course, in securing the best possible medical attention, provided they know where to go for it, and the poor can always secure adequate medical care in hospitals, in institutes endowed by voluntary contributions or in clinics supported by taxation. But a great intermediate group of patients of moderate means may often experience real difficulty in defraying the cost of adequate medical study and treatment, unwilling to be treated as charity patients, they frequently postpone consultations or in default of opportunity for anything better are fain to be content with partial studies and in-

complete treatments that are, in reality, inadequate and unsatisfactory. In an attempt to meet the needs of these patients of moderate means for adequate medical care, so-called "pay-clinics" and "public health institutes" are being established in different parts of the country, in these clinics and institutes an effort is being made to provide general and special diagnostic studies and appropriate treatment at small cost.

Programs of health insurance are being promoted with the idea of distributing the cost of medical care over a large number of people so that the yearly expense for any single person is small. Some industrial organizations employ physicians to give free treatment to their employees on a contract basis. Insurance companies are arranging for periodic health examinations of their policy-holders and find that by so doing they can prolong the lives of their policy-holders and add to their profits.

Public health services and programs of preventive medicine have also been undergoing radical change. Formerly, the health departments of cities and states were content with quarantine regulations, the control of water supplies, the sanitary disposal of sewage, the detection and segregation of animal carriers, and compulsory vaccination against smallpox, as Fitzhugh has put it, public health had, in the main, to do with the control of "things" rather than of "persons". But during the past few years, a vast campaign of preventive medicine has been launched, including plans for the education of the public in personal hygiene, in proper living conditions, in child welfare, in maternity welfare, in nutritional requirements, and the like. Public health nurses have been employed to inspect schools, and to visit families in their residences for the purpose of detecting incipient disease, and social service nurses and other social workers are not only studying living conditions but are engaged in directing sick children and even sick adults to special clinics of which they approve for diagnosis and for treatment. In one county in New York State, a comprehensive health campaign for the total population of the county has been conducted. Furthermore, in various parts of the country, so-called "health centers" are being arranged for and a movement is on foot for the partial support of such centers by taxation.

Is it any wonder that, with all these changes in medical educa-

tion, in medical practice, and in preventive medicine, there should be some confusion among physicians regarding duties and obligations? Is it at all surprising that medical societies should have been aroused to a discussion of many issues that are under controversy, or that our medical journals should contain many articles in which the legitimacy and advantages of some of the new modes of organization are questioned? In certain papers by medical men whose sincerity and good-will are undoubtedly, the profession has been urged "to fight to the last ditch" to prevent the socialization of medicine and to prevent the control of medical services by lay monopolists. Many articles describe a "crisis in medicine", in them the dangers of the present situation are strongly emphasized, particularly the dangers of what is called "State Medicine" and of control of the practice of medicine by laymen or by politicians.

The relative sterility of the medical work done in state and national institutions under government is contrasted by these writers with the productivity of private workers and of privately endowed institutions. The situation in Germany with its "*Krankenkasse*" and that in Great Britain with its "panel doctors" are held up to the profession as appalling examples that America should not follow, and society is urged to stop the movement in the direction of the socialization of medicine before it destroys the medical profession or its economic independence. It is urged, too, that many persons who are relatively well-to-do abuse the privileges of free dispensaries and of pay-clinics where fees are small, private practitioners are thus robbed of the patients who should employ them and of the fees that ought to be paid to them. In some places the organized profession has gone as far as denouncing the clinics that thus "compete" with private practitioners, in some instances they have expelled from membership in the county society the physicians who have participated in the work of such clinics.

On the other hand, those who try to justify the changes in the direction of the socialization of medicine appeal to the medical men themselves to assume the leadership of the new work. They assert that it is the first duty of the profession to supply the needs of the public for medical care. If, through lack of organization of, or leadership by, the profession, the public does not get what it needs, they believe that lay organizations or governmental agencies must

intervene. They assert that the public is not receiving now all the medical attention it should receive, that what the public gets costs it too much, that members of the profession are not sufficiently active in initiating and promoting humanitarian movements, that medicine has been behind in adopting business methods in its organization, and that too many medical men are dominated by selfish rather than by altruistic interests.

Perhaps I have said enough to make clear to you that new problems in medical ethics are emerging with great rapidity as accompaniments of the brisk changes that are taking place in the organization of our American society. How all these new problems can best be solved no one yet knows, but that they must be solved is certain. You who listen to me today will, yourselves, doubtless contribute to the solution of some of them. In the processes of solution, ethical questions of one sort or another will be continually arising to plague you, to answer them properly, you will need to exercise all your best powers both of head and of heart. Each of you will, I know, do his best to try to bring his own conduct into accord with the sanest thought of the time. I feel sure that, with regard to the solution of some of the problems, reason should control action in the direction of conservatism and against fanatical attempts to compel change, with regard to the solution of other problems reason will need to guide action, despite passionate opposition, in the direction of further socialization of medicine. In all your thinking with regard to these matters and in the making of your decisions you will do well to remember (1) that social conditions are constantly changing and that moralities and immoralities (inclusive of the medical) ought also to be undergoing corresponding change, (2) that both human individuals and the social groups of which each individual forms a part have rights and they also have duties, (3) that the promotion of social ideals should be judiciously fostered but the realization of those ideals ought never to be attempted prematurely, (4) that changes in the direction of socialization of medicine ought always to be consistent with the preservation of the solidarity of the medical profession, of the just rights of the individual members of that profession, and of the dignity of conduct that has been traditional among better physicians throughout all time, (5) that the best interests of the medical profession must, in

the long run, be favored by the increasing usefulness of the members in satisfying public needs, (6) that in true service to society the individual medical man ought to be able to find the highest possibilities for the realization of his own potentialities, and (7) that he who fails to keep in intimate touch with the life of his time and to adapt his behavior to the needs of that time can have no reasonable cause for grievance if the procession of life is regardless of him as it marches past him

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## THE ETHICS OF CONTRACEPTION

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IN THE present paper we shall confine attention to contraception as such, understood in the sense of carrying out the sexual relation and at the same time using chemical, instrumental or other means to prevent conception. We shall not deal with the many side issues that could be raised, such, for instance, as the medico-legal problems involved, surgical measures to prevent or interrupt pregnancy, control of births through complete sex abstinence, sex relations between the sterile or during pregnancy, and so forth.

The paper is, moreover, written from the ethical standpoint, and not from the medical or theological. As the writer is not a medical man, emphasis on the medical side would be carrying anthracite to Scranton. The writer is a Catholic, but in the following pages he makes no assumption of Catholic or any other religious or theological premises. The subject of contraception is here discussed purely from the standpoint of rational ethics.

An ethical discussion, to lead anywhere, must, however, presuppose certain premises or assumptions mutually agreed upon. We are, first of all, making the ethical assumption that altruism is the more desirable philosophy of life. Even the opponents of contraception would mostly agree that, should there be granted the desirability of egoism or hedonism as a philosophy of life, no issue could logically be raised against advocacy of birth control. A second assumption we are making is that what promotes human welfare is ethically desirable and what hurts human welfare is ethically undesirable. A third assumption, basic but not perhaps so much so as the foregoing two, is that the continued existence of the race is desirable.

Welfare or well-being is by no means identical with happiness or pleasure. It is true that where there is well-being there is more apt to be happiness. This however is not always the case. In certain types of psychosis, for instance, the individual is happy enough, often exuberantly so, but on the intellectual or emotional or both scores

he falls short of well-being. A man who is actually in perfect health but who thinks he has tuberculosis or angina pectoris may be very unhappy although he has physical well-being. *Vice versa*, he may have either disease without knowing it and be very happy, although his physical welfare is much below par. A person who is the slave of a violent temper or of an uncontrolled craving for narcotics, may not be altogether unhappy, but he lacks the freedom that comes with the captaincy of one's own soul, and, in so far as he is thus unfree, his higher welfare suffers. Illustrations could easily be multiplied. We merely wish to add one further illustration that has particular importance in the problem of contraception.

It is often said that a person who is selfish cannot be really happy. But our everyday experience does not appear to support this sweeping generalization. Many selfish people are, so far as we can judge, either reasonably happy or highly so. Yet we should probably all agree that unselfishness is more desirable than selfishness, and that an unselfish person is a more desirable type, has higher well-being and welfare, than a selfish one.

Happiness and welfare, in themselves or as ethical criteria, are not infrequently confused. The difference between the two things is however recognized, at least implicitly, even in the popular mind as expressed in such common colloquial sayings as "He doesn't know how well off he is." Happiness or pleasure is primarily a psychic, emotional phenomenon. Welfare or well-being is far more comprehensive, for it includes the whole man, with his manifold physical, emotional, cognitive, social, and spiritual needs and rights.

Altruism, or concern for human welfare, has two aspects, an objective aspect or altruism in deed, and a subjective aspect or altruism in motive. One may be altruistic in deed without being altruistic in motive, or may be altruistic in motive without being altruistic in deed. Altruism in its full meaning as a philosophy of life comprises both subjective and objective altruism.

Altruism in deed means doing good to one's fellowman through respect for his rights and fulfillment of his needs. If I owe an honest debt and pay it, I do good to my fellowman by respecting his economic rights. If I give food to a man who is starving, I do good to him by fulfilling his bodily needs. In such and similar cases, I do good to him in deed, quite regardless of the motive for which I do it. My motive

may be a very noble one or a very ignoble one, but objectively and in deed the good is done to my fellowman, his welfare or well-being is promoted

By what we here call subjective altruism we mean the motive for, or spirit in, which the objective good deed is done. A physician may generously donate his services to an out-patient department, not to derive any personal benefit therefrom, but purely because he is unselfishly interested in promoting the physical welfare of the poor. Another physician may volunteer his services to the same clinic, exclusively with a view to widening his professional experience and of so being in a position to increase his income from wealthy pay patients and thus enable him to surround himself with greater material luxuries. Both physicians in the case may do equal objective good to their out-patient clients, but in the first case the objective good is done from an altruistic and unselfish motive, while in the second case it is done from an egoistic and self-regarding motive.

The view upheld in the present paper is that contraception as such is, all things considered, in conflict both with altruism in deed and with altruism in motive, and is therefore unethical, or, if the term "unethical" be objected to, is humanly or socially undesirable. In presenting the evidence for this view, it appears of importance to emphasize the intimate relationship between contraception and the whole field of sex ethics. To illustrate this intimate and indissoluble relationship, we shall first present a hypothetical test case and then rapidly review the rational grounds underlying sex ethics in general. We shall then take up the ethical factors in contraception as such.

The test case is the following: "Suppose two people unmarried and with no intention of marrying determine to live as man and wife. They are both of sound physical and mental heredity and are both free of communicable disease. They are educated and intelligent, and they agree to take multiple precautions to avoid the risk of conception. They further agree that if by any chance conception should occur, they would then marry. They love each other and the marriage would probably be happy. On what rational grounds could extra-marital relations in such a case be looked upon as ethically undesirable or wrong?"

In this test case we have barred the hazard of defective heredity and of communicable disease, we have practically eliminated the

danger of unmarried motherhood, we have avoided the obviously harmful effects of unprotected infancy and childhood

The writer has put the above case and question to a number of highly intelligent friends who are earnest and honest advocates of contraception. From some, those who do not ethically disapprove of extra-marital sex relations, he has received the reply "Let the two parties in the case go ahead, they are ethically justified." This answer at least has the merit of being consistent. From those, however, who advocate contraception but ethically disapprove of extra-marital sex relations, the writer has yet to receive a consistent or coherent answer.

Some answer that such conduct on the part of the hypothetical couple is harmful because it may breed psychic conflicts. But we may urge in reply "Let's go to the root of the problem and cure society of its irrational and superstitious prudery, and then no conflicts will be bred." Besides, as a matter of fact, vast numbers who are sexually promiscuous seem little troubled with serious conflicts or any conflicts at all.

Others answer that such conduct is wrong because it is not in conformity with the current social code or with current sentiments. The implied major is: Whatever is in conformity with current social codes and current sentiment is ethically right, and *vice versa*. Admit this major and we get some bizarre conclusions. Cannibalism, head-hunting, human sacrifice, slave-trading, wife-loaning, child-murder, witch-burning, blood revenge, and myriad other harmful or atrocious customs would be ethically right for the peoples who practice or have practiced them.

Others answer that contraception is ethical among the married but unethical among the unmarried. But they fail to bring forward any rational grounds for the distinction, nor can the present writer discover any.

Others answer that extra-marital relations are wrong because the New Testament condemns them. This is shifting the basis of discussion from rational ethics to theology.

The above test case is not of course proposed as being in itself valid ethical evidence against contraception. It does, however, impel to the conclusion that one who holds birth control to be ethical cannot consistently hold extra-marital sexual relations as such to be

unethical Contraception cannot be dealt with ethically apart from the rest of sex ethics To attempt to do so, is to attempt a hopeless Shylock task The ethical reasoning that would justify contraception would for the most part justify extra-marital relations, and conversely the ethical grounds that are valid against extra-marital relations are for the most part equally valid against contraception Both contraception and extra-marital relations do grave harm to human welfare, and, on the side of unselfishness or subjective welfare, in identical ways To a summary review of some of the more important of these general sex-ethical grounds we may now turn

Physical sex activities are fraught with the most far-reaching possibilities of good or harm to human welfare, depending ordinarily and in the main on whether they are carried out within, or outside of, the marital union

The sex relation carried out within the marital union leads to the begetting and proper rearing of offspring It thus contributes to the basic being and well-being of the race Under a free-love régime, the being of the race might conceivably be provided for, but racial well-being would suffer grievously Marriage best fulfills, so far as is possible with human institutions, three of the most imperative and basic human needs First, it provides prolonged and maximum bi-parental care of offspring, secondly, it provides prolonged and maximum protection and care of the mother by the father, thirdly, it provides for the definite placing of responsibility on the true father The sex relation within the marriage bond thus makes for the maximum welfare of the child, the mother, and the race

Furthermore, subjective human welfare or the altruistic spirit is promoted thereby Around the marital relationship cluster, and out of it arise, the bulk of the noblest and most unselfish things in life, marital love, paternal and maternal love, filial love, fraternal love, kinship love, and probably in large measure broader neighborly love Delete these altruistic loves from human life, and there is not much left that is worth while

On the other hand, sex misconduct and particularly extra-marital relations gravely harm both objective and subjective human welfare From the angle of objective welfare, a free-love régime tends or would tend to bring children into the world without proper provision of maximum prolonged care by both parents, mothers

would not receive adequate care from fathers, and determining who the real fathers were and pinning down responsibility upon them would be very difficult and often impossible. The child, the mother, and society would suffer severely. Furthermore, at least actually in our western civilization, numerous other well-known evils follow in the train of extra-marital indulgence—evils such as the venereal diseases, the exploitation and betrayal of womanhood and childhood, the stigma and degradation that attach to illegitimacy and unmarried motherhood.

No less grave however, although perhaps less obvious and more intangible, is the subtler evil of undermining the extremely crucial element in subjective altruism, namely, the spirit of unselfishness. Generally speaking all forms of sex indulgence outside the marital bond have this in common that they imply the self-centered or selfish acceptance of the pleasures of sex while dodging the marital and parental responsibilities and sacrifices entailed. They constitute a species of personal, social, and racial sponging that stamps in and emphasizes the self-centered and selfish drifts in human life. Of this subjective harm more will be said below.

The rational grounds for sex ethics in general are not however the subject of the present paper. The chief ones are here very briefly sketched merely to illustrate further the fact that in the main the ethics of sex in general and the ethics of birth control in particular rest on grounds fundamentally similar or the same. We shall now pass to a review of some of the more outstanding hurts done by contraception to objective and subjective human well-being.

As regards objective welfare or altruism in deed, the most outstanding and obvious effect of birth control is that actually it leads and is leading to depopulation. Theoretically, that is, if we were dealing with a different race from our own actual one, contraception as a racial practice might not have this effect. The optimum—not necessarily the maximum—population level might be attained and maintained by a race of unselfish, highly coöperative, rational thinking machines. But human ethics has to deal, not with a race of superhuman thinking machines, but with our actual race of very human beings of flesh and blood.

Under present conditions prevalent in our western civilization, it is estimated that a birth rate of from 3 1 to 4 children on the aver-

age per married couple is required to maintain the present population level. But both our everyday experience and our statistical data make clear that the average couples who practice birth control do not produce the required 3 1 to 4 children. And we have barely started on our birth control career. How much lower reproduction in the average birth control family will go no one can foretell. To recommend birth control but at the same time counsel that it be practiced with due regard for the welfare of the race is overlooking the fact that the average human being is governed not by cold reason but by interest and craving, not by concern for the race or for posterity but by personal desires and satisfactions. It is overlooking the fact that we are dealing with this very human race of ours and not with a hypothetical race from a far-distant dark star.

No living agricultural expert of standing holds that overpopulation prevails today in the world in general, or in the area of western civilization, or in the United States in particular. Nor is such overpopulation or even saturation in sight on the immediate horizon. That saturation might come some day is not impossible. It is however a bridge we can cross if, and when, we come to it. It will be nothing new in the history of the race. The state of saturation has probably been the normal condition of the race from early prehistoric times.

It is not necessary to conjure up the grim ogres of war, famine, and pestilence to relieve hypothetical future pressure of population on the soil. The bridge can be crossed, should we have to cross it, by a much simpler and less dramatic means. This means, one which is both ethically unobjectionable and biologically efficient, is a slight deferment of the marriage age, a deferment which is already under way in some classes of our present population. This is no fanciful solution. Economic pressure, quite apart from other factors, would easily bring about such deferment, as it has often done in the past and in a certain measure is doing again. Nor is it an anti-social one. Deferment of the age of marriage is commonly believed to lead to grave sex immoralities. That it *may* so lead, no one questions. That it *must* so lead, can be categorically denied. From the abundant data of culture history, we know of no correlation between age of marriage and level of sex morality. Many, even uncivilized, peoples that

tomarily marry late have had or have decidedly high levels of pre-marital sex morality

Our real problem today is not that of far-future overpopulation, but rather of near-future depopulation. The recent studies of Kuczynski of northern and western Europe have shown that the process of depopulation is already well under way there, that one hundred northern and western European mothers are on the average giving birth to only ninety-three future mothers, and that the population must inevitably die down and die out unless this downward trend meets with a check. Likewise, recent studies, not yet published in full, show that in the United States we are following the same depopulation trend, which will show definitely in the census statistics within the next couple of decades.

Without being or existence there cannot be well-being or welfare. The basic element in human well-being is being, existence, physical survival. Depopulation or racial death is as fundamental a hurt to racial well-being as is loss of life to individual well-being. A birth control régime, regardless of what it might theoretically result in were the race composed of superhuman thinking machines, actually leads and is leading to depopulation. The only point that remains doubtful is just how far will or can depopulation go. Statistically we know no limit, nor do we know of any present or prospective major impelling force or motive that can check the process once it gets under way as it has already gotten under way. We are finding, far sooner than we anticipated, that the term "race suicide" is not merely a picturesque rooseveltian catchword.

So much for the chief objective hurt done to human welfare by birth control. Let us turn to the less tangible but no less grave subjective hurt, which birth control in common with extra-marital relations or similar typical sex misbehavior, does to human beings.

Three distinct psychic currents blend together in the whole domestic relationship, the physical sex urge, love, and the parental impulses. Love and the physical sex urge are often confused with each other. They are, however, two quite distinct things and in actuality may often be found one apart from the other, although they commonly tend to exist side by side. Love is a complex phenomenon but it is characterized by two main groups of impulses or cravings: the craving for companionship, affection, response, understanding,

possession, and so forth, the craving to do and to sacrifice for the one loved The parental impulses likewise include two clusters of cravings—cravings for response, and so forth, as in the case of love, and likewise cravings to do and to sacrifice for offspring

These various elements in the whole domestic relationship are of varying human value The craving for physical sex satisfaction and the love craving for companionship, understanding, response, and possession are fundamentally self-seeking, self-centered, self-regarding, egoistic On the other hand the craving or willingness to do and to sacrifice for loved mate and offspring that goes with marital love and parental impulses respectively, is fundamentally other-seeking, other-centered, other-regarding, altruistic

The motives and forces that impel men and women to marry are more commonly the physical urge and love's craving for companionship, understanding, and possession These motives and forces are self-regarding ones Once, however, married life is entered upon, the conditions thrust upon the couple constitute powerful incentives to the awakening and play of marital and parental altruistic motives and forces Altruism does not of course bud forth automatically and of iron necessity But nevertheless domestic life is favorable to its growth, and marriage is for the great mass of human beings the one and only great school of altruism in spirit as well as of altruism in deed

Married life normally calls for innumerable major and minor mutual sacrifices and responsibilities on the part of both husband and wife Moreover the rearing of offspring entails two or three decades of care and unselfish responsibility, of curtailment of liberty and renunciation of personal preference, of sacrifice and self-denial of the most altruistic kind It means for most married couples hardships courageously faced and borne, moral strength persistently and consistently put forth, responsibilities unflinchingly shouldered, sacrifices unselfishly made Marital and parental love may make the sacrifices and renunciations easier or in a measure even a joy, but the sacrifices and renunciations are not on this account a bit less real The unselfish mutual love of husband and wife is sustained, fed, and further purified by their common sacrificial and unselfish devotion to, and care of, their children Through child-bearing, and child rearing, fathers and mothers

selfish altruism in deed and in motive, not by the feeble words of human exhortation but by the living experience of their very parenthood and conjugal life

Contraception carried out systematically leads, so far as the parties concerned can control the process, to the elimination of the child, and consequently of the parental factor, from the domestic relationship. This eliminates one of the two great unselfish influences from the home. Total elimination of this element occurs in the deliberately childless family. Partial elimination in the customary contraceptive family of one or two or at most three children will be taken up a little more in detail farther on.

Even in the childless family, however, there may still remain marital love with its important unselfish element. No doubt in individual cases this unselfish love element may and does survive notwithstanding contraceptive practices. We have no assurance however that in the long run or even in the short run, biologically and racially speaking, this unselfish love element can or will survive, if contraceptive practices become generally prevalent.

Pre-marital and marital love, as distinct from the physical sex urge, has evolved concomitantly with, and in genetic relationship to, the need on the part of offspring for *bi-parental* care. We find the physical sex urge but none of the rudiments of love proper in sub-human bi-sexual species that give no parental care to offspring or that give only maternal care. We do, however, find rudiments of what on the human plane we call love in those sub-human species, such as many birds, that are characterized by *bi-parental* care of offspring. It is the biological function of love to hold mates together during the more or less prolonged period of immaturity in offspring.

Love with all its main egoistic and altruistic features is found, it is true, among many even of the most primitive human tribes, notwithstanding occasional denial of its existence among them. But it is by no means as deeply imbedded in humanity or as universal as are the parental impulses. Among many peoples it seems to be so feeble as to be almost or quite inoperative.

The two facts regarding love we are here stressing are first, that it has biologically originated out of the needs of offspring, by what evolutionary process we know not, secondly, that it appears only superficially and insecurely imbedded in the human psyche.

These two facts suggest strongly that if the child be eliminated from the scene through birth control widely and systematically practiced, altruistic pre-marital and marital love with its close genetic relationship to offspring and with its tenuous grip upon the race can easily atrophy from disuse or be bred out of the race, in the long run at least and perhaps in the short run.

In a word, birth control tends to eliminate from the home and from the whole domestic relationship the two and the only two great forces and motives that nurture unselfishness therein. And while eliminating the unselfish elements in love and the parental impulses, it automatically and conversely reinforces the self-centered and selfish forces and motives in the physical sex urge and in love's craving for understanding and possession. No one contends for a moment that contraception has this effect in every single case. But such is its broad drift for large numbers and in the long run perhaps for all.

We may further call to mind that the great unselfish impulses and cravings in romantic and marital love and in the parental instinct are the only really great natural driving forces in the human make-up that are adapted to awaken or to keep at high pitch human unselfishness in motive and in conduct. There are other forces, it is true, such as, for instance, friendship or patriotism, but for the vast and overwhelming majority of humanity these other forces are relatively pale, weak, and lifeless. Delete marital and parental love from life, and the spirit of unselfishness largely vanishes from the stage of human behavior.

We have still further to recall that the interest, activities, and loyalties of the overwhelming majority of men and women are centered first and foremost around their home and family. Such interests, activities, and loyalties represent probably 90 per cent or more of the interests, activities and loyalties of humankind. Delete unselfishness from the family circle and for all practical purposes you delete unselfishness from human life and leave humanity crawling in stark and sordid egoism and self-centeredness.

We would hold, therefore, that birth control is ethically undesirable for the same fundamental reasons that extra-marital relations are undesirable. Both gravely hurt the objective and subjective welfare of the race. Birth control constitutes a subtle but deadly attack upon the welfare of the race upon objective human welfare, because

it leads actually toward depopulation and perhaps extinction, upon subjective human welfare, because it leads to the dethronement of unselfishness from life and to the enthronement of self-centeredness and egoism therein

And as a matter of fact, we have at hand an abundance of evidence indicating the close relation between contraception and selfishness. Our contraception questionnaires do indeed develop the fact that married couples who practice birth control more commonly aver that they do so for reasons of financial necessity. That real necessity exists in many cases no one would question. That however the defense as averred is, in a high proportion of cases, a matter of rationalization is reasonably clear from the fact that birth control tends to be practiced most on economic levels where financial necessity presses least or not at all.

There is still other evidence of this close relation between contraception and selfishness. Where married couples set out, as they are increasingly doing, with the deliberate purpose of having no children at all, the selfish evasion of responsibility and sacrifice is usually obvious, and, not infrequently, is frankly admitted by them. But even where birth control does not go, as it is increasingly going, to the limit of complete childlessness, the same self-centered tendency is in evidence, even though perhaps in a more tempered degree. And this brings us to the case touched upon earlier, namely, that of the couple who already have or plan to have perhaps one or two or even three children and who argue that having done their part they may ethically practice contraception.

The situation in a large number of these cases, perhaps in the great majority of one-child and two-child birth control families, is rather closely paralleled in the custom of keeping family pets. The writer is anxious to emphasize that the comparison is here made with no touch of sarcasm but merely because it illustrates a fact. A great many of us keep one or even two dogs. These pets are a care. But the care is compensated for in many ways that are familiar to all lovers of dogs. We keep dogs for egoistic, not for unselfish, motives. The compensations of pet-keeping outweigh the responsibilities and sacrifices that may be entailed. Not many of us, however, go in for having four or five or six dogs. The care in such cases outbalances the compensations.

The case is quite similar as regards offspring, toward whom the cravings and compensations are psychologically close kin to, if not identical with, those experienced toward household pets. One or two children are certainly a care. But the compensations from one or two offspring balanced against the care outweigh the latter with most couples. At about this point however a law of diminishing returns sets in. Where there is only one or two or even three children, the ordinary contraceptive quota, the compensations tend to outweigh the sacrifices. Where, however, the number of offspring goes beyond into four or five or six, the compensations do not as a rule appreciably increase, whereas the sacrifices do, and so the unselfish sacrifices outbalance the self-regarding compensations.

Furthermore, we have to reckon with an important aspect concerning objective welfare. To safeguard against depopulation, an average of between three and four children *per married couple* is required in our western civilization. Couples that practice birth control do not on the average beget the three or four children required, and rarely indeed do such couples beget four or five or six children. Yet if depopulation is to be avoided, a large proportion of families must so beget more than three or four children, for the very simple reason that a very large proportion of other couples, owing to sterility or to late marriage, cannot biologically produce more than one or two children.

For want of space, no attempt has been made in the present paper to present the numerous secondary harmful effects of birth control, or to deal with the various arguments advanced in its favor. The writer has attempted to do this elsewhere.\* Some of these arguments must be dismissed as having no validity at all. Others, so far as they go, undoubtedly carry a certain weight. In this, however, as in all other ethical discussions, final practical judgment has to be formed by a weighing of the gains to welfare against the losses. A powerful case, for example, can be and is brought against the right of private ownership of property, if one takes into account only the evils attendant upon such ownership. But most ethicists support the common social conscience of humanity in holding that private ownership is justified in view of the fact that the benefits to

\* "Birth Control," National Catholic Welfare Conference, Washington, D. C., Chaps. V-VIII, 1923.

human welfare outweigh the evils. In the case of contraception, some benefits accrue in certain instances, but, in the view of the present writer at least, these exceptional benefits are enormously outweighed by the normal, far-reaching and fundamental hurts resultant to human welfare from the practice of contraception.

Perhaps the most common or at least the most forceful appeal in favor of birth control is the appeal for protection of the mother's life or health. In this case, however, quite apart from any ethical considerations, we have to bear in mind that no contraceptive measures are infallible. If the mother's life or health is in real jeopardy, there is only one adequate safeguard short of surgical measures. That safeguard is complete continence. To dub such continence "asceticism," as is sometimes done, is an unjustifiable misuse of English, a darkening of counsel with words without knowledge. Continence in the case calls for no asceticism. It does call for high, but not super-human self-control. Nobody but a fool would hold that self-mastery under the circumstances is easy. But nobody except fools ever held that living up to unselfish ideals in this or any other human relationship is easy. Such living calls and calls often not only for high but for heroic self-mastery and self-sacrifice. It is the price that must be paid by anyone who wills not merely to preach and praise altruism but to live it.

## THE BIBLICAL SIDE OF CONTRACEPTION

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I SPEAK as a Christian guided by the precepts and ideals of the Bible as well as by the light of a quickened conscience I oppose contraception for the following reasons

The relation between husband and wife is sacred as an expression of the oneness of the married state and the highest expression of affection

Meddling with the relation, violating the natural law, is impure and degrading to both men and women, and therefore immoral

Meddlesome attempts to regulate conception are especially degrading to the wife who is treated as a prostitute, a mere vessel of convenience for her husband, as in the vast Moslem world and in China and India

The control of the birth rate, if right and desirable for health reasons, is attainable by continence which contravenes no law and is at times commendable.

A rightly ordered married life frequently calls for protracted periods of continence, establishing the principle

Official sanction of contraception stamps the sex relation as an imperative necessity and enthrones lust in the life, justifying the degraded moral conditions in seaports, the abuse of captured women in war time by soldiers, and sanctioning the conduct of naval officers who might seek a wanton in every port, thus adding to the wholesale degradation of womanhood and consequently of our whole race

God punished Onan with death for a violation of the natural relationship as well as in refusing his duty as an Israelite to his deceased brother, the act was a sin punished by death

Such regulatory contraceptive teachings are but futile attempts to remedy a profound social evil, namely, the distressful condition of many of the poor and their insufficient wage, while tending to relieve the employer of his duty to concern himself in the welfare and remedial care of his employees

The tacit sanctioning of the indifference of employers to their obligations by attempts to aid (sic) their poor employees by contraceptive methods limiting families results in the breaking down of fundamental social moral standards

The poor who are supposed to profit most by the advice given are the very ones who will give it the least heed. The rich and the hedonists, however, will all grasp their opportunity and consider the recommendations as a sanction for the violation of the law of purity, without which a nation exists but in name

The true remedy lies in the propagation of a genuine Christian faith among all classes, no regulatory or "be practical" plan to overcome social maladjustments has ever succeeded when God was left out

The attendant evils which proponents seek to minimize far outweigh the problematical estimated advantages, for the result assuredly will be a great increase in sex promiscuity, even to the encouragement of such intimacies among our boys and girls of school, high-school, and college age. The open discussion of these matters already has had a notable effect in these channels

The spreading of such an evil as contraception also surely will entail an enormous increase of syphilis and gonorrhœa with the attendant national deterioration

# Medical Questionnaires

Collated by B BICKEL, M D

Washington, D C

*Do certain foods prevent goiter?*—The goiter is a major problem on the Pacific coast, including parts of California, also around the Great Lakes district of the St Lawrence River and parts of the Rocky Mountain states. In South Carolina, goiter is practically non-existent. In that state, enormous amounts of iodin are found in the fruits and vegetables. A laboratory commission studied the chemical composition of green foodstuffs there, and found that manganese, iron, and iodin were more abundant than in vegetables and fruit grown in California. The amount of copper did not differ materially. The named chemicals are associated with vitamins A and B. They are indispensable in the regeneration of hemoglobin, and green leafy vegetables are the best source. Weston found a maximum of parts per billion, dry basis:

	Iodine	Copper	Manganese	Iron
Lettuce	2067	11.01	133.27	2110
Spinach	1178.5	12.33	172.64	1750
Beet tops	657	13.48	182.96	not available
Carrots	466	10.17	48.95	765
Turnips	588.5	4.40	13.53	not available
Asparagus	574.5	14.66	37.28	690
Tomatoes	166.5	17.02	27.15	185
Squash	1018	12.48	23.00	130
Irish potatoes	254.5	6.57	10.27	300
Sweet potatoes	266	5.72	10.38	88

An analysis showed that turnip tops and cabbage are rich in iodine. On the basis of animal experiments Webster and Chesney have found that exclusive cabbage diet is a major factor in promoting simple epidemic goiter in rabbits. Iodin administered orally in quantities of 7.5 milligrams per week had an appreciable protective influence against the goiter-producing factor. They found that this influence was more marked in winter than in summer, and think it possible that it is effective under the influence of oxidation.

reduction in the body Thompson, Thompson, Brailey and Cohen suggest that iodin reduction in the high basal metabolism of exophthalmic goiter is due to an inhibition of the secretion of the normal thyroid hormone, and that, as far as can be determined clinically, the myxedema which occasionally develops during administration of iodin to patients who have a normal basal metabolism following a subtotal thyroidectomy, is due to an inhibition of the secretion of the normal thyroid hormone Cantiло, likewise from animal experiment in connection with acidosis and hyperthyroidism, studying the variations of the alkali reserve of the red blood-corpuses, suggests that a therapy destined to reestablish the alkaline reserve might be of aid in hyperthyroidism McCarrison, in studies on 2651 albino rats, in a locality where goiter is not endemic, found 148 with goiter He concludes that goiter is not due to endemic influences He found that it was more apt to develop at the time when maturity is gained. Food deficient in vitamins was productive of the condition The administration of iodin to deficiently fed rats was favorable to goiter-production, its administration to rats fed on physiologically complete food diet did not favor the occurrence of goiter Weston is of the opinion that the solution of the goiter problem will be accomplished through food rich in iodin, iron, manganese and copper, and possibly other minerals which are not yet sufficiently known This is suggested by the absence of goiter in the states of this country where the vegetables and fruits contain large quantities of the above-named ingredients

CANTILO, ENRIQUE "Acidose et hyperthyroïdie," *Presse méd*, vol 38, pp 722-723, 1930

MCCARRISON, ROBERT "A Goiter Survey in Albino Rats," *Brit med J*, No 3621, pp 980-992, 1930

THOMPSON, W O, THOMPSON, PHEBE K, BRAILEY, ALLEN G., AND COHEN, ARCHIBALD C "Myxedema During the Administration of Iodin in Exophthalmic Goiter," *J Med Sc*, vol 170, pp 733-750, 1930

WEBSTER, BRUCE, AND CHESNEY, ALLEN M. "Studies in the Etiology of Simple Goiter," *Am J Path*, vol 6, p 275, 1930

WESTON, WILLIAM "Foods in the Solution of the Goiter Problem," *Southern Med J*, vol 23, pp 479-483, 1930

*Is the Calmette protective vaccination against tuberculosis sustained?*—Calmette claims absolute safety upon grounds of 400,000 injections The vaccine was not, however, found innocuous at Tru-

deau sanatorium by Petroff and Brauch. In two instances, guinea pigs developed generalized tuberculosis. Other laboratorians have stated that small laboratory animals succumbed. Professor His invited Doctor Weill-Hallé of Paris to discuss protective vaccination of children against tuberculosis at the Charité hospital in Berlin. Professor Schlossmann had reported favorably, and so had been the experiences at the Berlin Children's hospital. At Lubeck the vaccine was employed on official recommendation of the local health board. Of 246 infants who were inoculated, according to Calmette, fifty became severely ill with swollen inguinal and abdominal glands, and other symptoms of acute tuberculosis, and (more than) fourteen died. The German health office then investigated, and found that the original cultures had been purchased at Paris, and that the subcultures had been made by the very competent Doctor Deycke. Midwives had been instructed to employ the vaccine, if parents consented, and not all vaccinations had been made at clinics, so that there was no immediate control. The Reichsanstalt for combating infant and child mortality makes the statement, that although tuberculosis in infancy and early childhood is recognized as entailing grave and fatal disease, Calmette's figures for tuberculosis mortality are far too high for other countries. Langer's 6 per cent is generally accepted for Germany. Morbidity from this disease is as serious, as infant tuberculosis involves danger from metastases for years. It has been shown that, if a child can be taken out of its surroundings, even temporarily, an infection arising later is, as a rule, benign. To effect such isolation is difficult, therefore protective vaccination against tuberculosis fulfils its task, if it succeeds in weakening the infant infection in a measure to render its course benign and without symptoms. Not a complete protection from tuberculosis is attempted, but an immunity for age groups which have insufficient resistance. Langstein further states that animal experiment is insufficient to gauge the results in the human, and that even now there is no protective vaccine which has afforded satisfactory active immunization even in animal experiment. Pirquet was reticent to Calmette's vaccine which has been used in many countries. England and Austria have held back on introduction of this protective measure. It is a living vaccine and therefore subject to changes in virulence. Langstein points out that too much reticence

has been observed against the vaccines of inactivated tubercles however, which, if used correctly, produces tuberculosis allergy in the child. It is used with approval for highly endangered children. Roy E. Thomas points out that the development of the tubercle is exclusively a proliferative process, and that exudation is an allergic reaction which, in reality, is a defensive phenomenon, although it may produce alarming symptoms. If children are exposed to contact with open tuberculosis, the primary tubercle forms as a proliferation of the epitheloid cell. This is the pre-allergic phase which is followed by the allergic condition upon which depends the course of the disease. At this early stage isolation is the most hopeful. More and more, this measure and hygienic improvement are aimed at by both the profession and the parents. Emerson stresses nursing, proper housing and supervision of the open cases. It is prevention in this form which the institutions that have made it their task to combat tuberculosis have aimed at. There are today 618 sanatoria, with 73,695 beds for the active cases, in the United States. Proper teaching goes with the treatment, and those who have had the benefit of the sanatorium are apt to prevent spreading of their disease.

CHADWICK, HENRY D. "Tuberculosis in Children," *New Engl J Med*, vol 202, pp 1044-1048, 1930

DICKER, LLOYD B. "The Treatment of Juvenile Tuberculosis," *Calif and Western Med*, vol 32, pp 414-415, 1930

EDITORIAL "The Tragedy with B C G Vaccine at Lübeck," *Lancet*, vol 218, No 5560, pp 1137-1138, 1930

EMERSON, KENDALL "Where Are We Going with Tuberculosis Control?" *New Engl J Med*, vol 202, pp 1039-1041, 1930

LANGSTEIN, LEO "Zur Tuberkuloseschutzimpfung," *Deutsche med Wochenschr*, vol 50, pp 904-905, 1930

*Why does insulin not help all patients suffering from diabetes?* — Professor Macleod, in his 1930 Oliver-Sharpey lecture, pointed out that every now and again the practitioner meets with a diabetic patient in whom insulin seems insufficient by itself to maintain health. The term diabetes is gradually becoming restricted to a disturbance of the carbohydrate metabolism, produced by a deficiency of insulin, as a result of the endocrin activity of the islands of Langerhans. Glycosuria is one evidence of the disease. It may be produced artificially and may disappear upon treatment. Hyper-

glycemic blood-sugar levels are considered indications of the disease by Rowe and McManus. There is an insulin-resistant hyperglycemia. It has been seen following surgical removal of the posterior hypophysis. There is another argument throwing theories out of gear, namely, the marked tolerance of carbohydrates in severe cases of pituitary failure, associated with completely normal blood-sugar level. In considering hormone control more important than nerve control for practical purposes Macleod agrees with Rowe and McManus, and others, that diabetes is more restricted to conditions directly traceable to lowered endocrin function of the islands of Langerhans. A true pancreatic diabetes is admitted, which may be synchronous with other endocrin, or non-endocrin conditions that may cause glycosuria. Certain non-endocrin states, including psychosis, lesions of the central nervous system, primary anemia, lymphatic leukemia, malignant neoplasm, hepatic dysfunction, and syphilis may be associated with glycosuria, and vice versa. Glycosuria with normal blood sugar is noted in physiologic pregnancy. There are, then, numerous causes, not all directly relatable to the pancreas, among which the dysfunction of the islands of Langerhans seem the most prominent. Leyton agrees that hyperglycemic glycosuria need not be diabetes mellitus. He believes that, in a patient without symptoms, one should base the diagnosis on a considerable loss in storing power, and of burning sugar. When hyperglycemia occurs during protein shock, Leyton considers this as a sign of diabetes mellitus. He points out that the metabolism of an individual is not a constant unchanged process. Both quantity and quality vary. He defines diabetes mellitus as a disease due to a progressive deterioration of the metabolism, primarily that of the carbohydrates, and secondarily of proteins and fats. Soskin warns that the antidiabetic power of any remedy must not be judged solely by its capacity to lower the blood sugar in a normal animal. He found that none of the preparations that had been introduced simply because they lowered the blood sugar could keep a depancreatized animal alive for a long enough period to justify their acceptance as insulin substitute. Their number is great. Many clinicians and practitioners are now inclined to give insulin during the later stages of the disease. Non-specific treatment is advocated by many. Singer has gained the impression that complex irritating elements,

especially proteins, have a favorable influence, or may change the case entirely, when given parenterally. He treated 500 cases with protein exclusively, at least all medium cases, and some severe ones. Insulin was given in the worst in case of coma and juvenile diabetes. He starts from a standard diet, mainly vegetable. His scheme is

	Cal	K H	Pr	V
2 times $\frac{1}{4}$ litre plain bouillon				
2 times 150 green vegetable				
2 times 100 grams salad or pickled cucumber				
1 diabetes bread, 25 grams				
2 black coffee	1085	15	24	82
100 grams butter				
$\frac{1}{4}$ litre white wine				

This diet is given for several days, then the standard diet of

	Cal	K. H.	Pr	F
basic diet	1085	15	24	82
100 grams beef, boiled or fried	230	—	30	12
2 eggs	154	—	12	10
30 grams white bread	75	17	1	—
$\frac{1}{4}$ litre milk } = 50	170	44	75	112
	—	—	—	—
	1714	44	75	112

Leyton is solicitous of causing no pain when the blood specimen is taken. He points out that a diet poor in carbohydrate given before the test for sugar tolerance is made will render the blood sugar higher, and the hyperglycemia will persist longer than when ordinary diet is given. If, on the other hand, a patient with a depressed carbohydrate metabolism fasts for some time before the test is made, the concentration of sugar in his blood will not be so high or persist as long as when the patient has been allowed ordinary diet for four preceding days. A healthy man who has fasted gives a curve simulating that of a diabetic, and that of a diabetic gives one resembling the healthy curve. For three days Leyton gives a diet poor in carbohydrate which is also poor in energy, thirty grams of carbohydrate, fifty grams of protein, eighty grams of fat. The urine is collected and measured every twenty-four hours, and total excreted dextrose estimated. After three days, thirty grams of pure carbohydrate are added and continued three days, repeating the increase three times. If sugar elimination becomes constant after a few days

treatment with 9.2 to 9.3 cubic centimeters intramuscular he gives protein. No local or generalized reaction should be produced, and no fever. Some of the preparations employed were novoprotein, phytoprotein, aolan, protasin, etc. Yatren was not used on account of its iodin content. Most cases are sufficiently improved in from six to eight weeks. Of ninety-three cases 48.94 per cent. showed good results, 59 improved, no results in 18.94, and 1.05 per cent. grew worse.

Foster points out that concessions are not always made, in the diet of diabetic children, to growth requirements which differ considerably from those of the adult patient. More calories are necessary, and if one gram of protein per kilogram body weight is sufficient for the majority of grown patients, two grams are not too much during the growing period. Walter B. Meyer believes that wherever diabetics have to cope with conditions making demands upon their immunitary and reserve and defense powers over and above the diabetes, that over-insulinization becomes necessary.

FOSTER, NELLIS B. "Insulin Its Use and Misuse," *J. A. M. A.*, vol. 94, pp. 1971-1974, 1930, "Foods and Diet in Diabetes," *J. A. M. A.*, vol. 94, pp. 1974-2010, 1930

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MEYER, WALTER B. "Neuere Gesichtspunkte und die Behandlung und Beurteilung des Diabetes," *Med. Welt*, vol. 4, pp. 625-628, 1930

ROWE, ALLEN WINTER, AND McMANUS, MARY "Non-diabetic Glycosuria," *Am. J. Med. So.*, vol. 179, pp. 761-774, 1930

SINGER, GUSTAV "Die unspezifische Behandlung der Diabetes," *Mitt. d. Volks- gesundh. amts*, No. 6, pp. 171-176, 1930

STEJSKAL, KARL "Ueber Toleranzsteigerungen bei Diabetikern," *Med. Klin.*, vol. 26, pp. 508-509, 1930

*Is there any successful treatment for Roentgen epithelioma?*—Many practitioners working with Roentgen-rays during the last twenty-five years will remember the distress of the doctor when a patient who had undergone treatment returned with a burn, and how many remedies have been tried. And then there are all our great specialists who have, one by one, suffered pain and apprehen-

sion when in relieving others they themselves had sustained burns Many renowned roentgenologists have undergone numerous operations to stay the progress of the developing epitheliomata, only to find that amputation and crippling was their fate One of the French profession reports with gratification that there is help Dr J Nicolas, of Marseilles, reports his Roentgen epithelioma cured by means of the Bordier method He adds that there is no longer any reason for leaving such lesions untreated Another, Doctor Debedat, of Bordeaux, was cured Under local anesthesia the cancer is subjected to coagulating diathermy, and in less than two minutes it is carbonized After that a 1 100 phenic vaselin is applied The scar, in Doctor Nicolas' case, dropped off on the ninth day After two months the lesion was completely healed

NICOLAS, J : "Épithélioma de Roentgen ulcère guéri en une seule séance par la diathermocoagulation," *Presse méd*, vol 38, p 631, 1930

*What can be done for edema of the feet without albuminuria?*—Many patients complain of swollen ankles and feet, mainly women, especially the middle-aged, but also children and men Frequently they are suffering from chlorosis, or varicose veins of the legs Beri-beri or starvation may cause it It may precede the appearance of albuminuria, in the early stages of nephritis, or the pregnant kidney But there are the other common swellings of legs and feet The complainants are most common in debilitated women Generally the condition is associated with acidosis and a consequent increase of water content of the body as a whole Osman believes that it can be cured if sufficiently large quantities of alkali can be given by mouth to overcome the acidosis and promote diuresis This edema is not due to renal, cardiac or other organic diseases Often it is associated with lassitude, amenorrhea—all from debility, Osman thinks

OSMAN, A. ARNOLD "Swelling of the Feet and Ankles not Associated with Albuminuria or Gross Organic Disease," *Brit Med Jour*, No 3616, pp 780-782

*What does the cardiogram show regarding heart-lung proportions?*—Beneke and Muller studied lung-heart relations of dead bodies for the entire period of growth, taking volume and weight of

the heart and body height. At present the orthodiagram is used to find the heart-lung quotient, a figure showing how often the cardiac transverse diameter is contained in the breadth of the lung. This relation is characteristic even at the age of three years. The heart volume, with progressing increase of body height, decreases steadily as compared with the height. There is not a comparative increase of growth but actually a proportional decrease of the cardiac growth. This applies to the aorta and the vessels about the heart, likewise. With increasing height the narrow thorax becomes more pronounced and the heart smaller. After the height has been attained at puberty the incompetent relation of height and thorax-heart-arteries breadth becomes marked. The thorax follows the growth of the lungs. Asthenia is the misproportion of growth in breadth as related to the entire constitution. So the heart type goes with a characteristic general constitution. Undernourishment, age, blood condition, and glandular secretion have an influence. The asthenic has poor muscles in many instances, long bones, thin, pale skin, long neck and thorax, clavicles and scapulae protrude. The intercostal spaces are wide, the thoracic apertures narrow. Kraus finds very small hearts a rule in this group. There are many of this habitus among sportsmen. It is necessary to give cautious advice when asked regarding the advisability of such individuals taking up sports. Careful inquiry about former infectious diseases, articular rheumatism following diphtheria, typhoid, scarlet fever, influenza, tonsillitis, etc., should be made, and the heart examined for any damage which might have been the result.

KIESCH, OSKAR "Wachstum und Verhältnis der Herz und Lungengrösse zur Körperlänge," *Klin. Wochenschr.*, vol 9, pp 881-883, 1930

VEIKL, EBERHARD "Herz und asthenische Körperkonstitution," *Med. Welt*, vol 4, pp 387-390, 1930

*Is there a prodromal blood-picture for whooping cough?*—Opitz, in his book on blood diseases of children, has pointed out that distinct blood changes precede whooping cough even while a child apparently feels well. It is described by Wolff, who had occasion to correct an erroneous diagnosis in a child, aged one, who entered the clinic with a febrile bronchial catarrh. The large tonsils forced

the uvula forward Removal of tonsils and adenoids improved the child rapidly The next morning the blood-picture showed hemoglobin, 62 per cent, erythrocytes, 4,290,000, leukocytes, 75,000, of which myelocyte 1, rods, 1, segmented, 7, monoleukocytes 5, lymphocytes, 86 This was a picture of lymphatic leukemia The child felt well, but liver and spleen were normal, and there were no cutaneous hemorrhages

WOLFF, SIEGFRIED "Fehldiagnosen," Deutsche med. *Wochenschr.*, vol 56, pp 787-788, 1930

*What is recommended for young children with a "nervous" stomach?*—Very young children may persistently refuse to be fed, and, if fed, vomit Lereboullet finds a hypersensitiveness of the gastric mucous membrane There are many vomiting infants who have been correctly fed, and who have no congenital hypertrophy or stenosis of the stomach The habitual vomiting may be an isolated symptom It may follow ingestion of mother's milk, cow's milk, or any artificial food immediately, or after a few minutes or one or two hours The milk is more often clotted than not. These children are very thirsty The stools are generally normal, constipation is rare, so is diarrhea The children are of the lively, excitable type, will shriek suddenly at night This lively type may not vomit habitually, but the children may have a poor appetite, which may lack for a time, or constantly Sometimes this condition starts after some infectious disease associated with some toxemia, for instance, cholera-like diarrhea or bronchopneumonia. If liquids and water are refused, the condition is grave Often considerable fatty degeneration of the liver has been found in such cases If anorexia becomes chronic, anemia develops Sometimes the infant or small child refuses to take all but water, or all but mother's milk or all solid food. Anemia is associated with loss of appetite, and it will be difficult to determine whether anorexia is cause or effect A blood examination will help decide, and also find a possible congenital syphilitic background of the nervous gastric symptoms Examination of the gastric content brings brownish, slimy material to light, in some instances, and then lavages are indicated Tuberculosis must not be overlooked in this connection An attempt must

be made to feed the children with deficient appetite well in spite of themselves, though force cannot avail. The best success will come from mother's milk, and much patience will often succeed. Lereboulet mentions asses' milk as an alternative. It seems that in many countries of Europe the milk of many more different animals is used than in the United States, where more commercially prepared foods are fed. Sugar should be added to increase the tolerance of milk. Some advise boiling down of milk and pap to decrease the bulk, but then sugar-water will have to be given during the intermissions to forestall dehydration. Pepsin and sodium citrate have been recommended, or alkaline water, for instance, Vichy. Marfan isolates children with poor appetite and feeds by tube two or three times a day, if the children begin to show bad affects of their failure to take food. He thinks this especially useful if the children are very lively. Marfan believes that purely nervous anorexia is quite rare, therefore careful search for anemia or infection, or other nervous conditions, is necessary. As a general rule, loss of appetite and also vomiting pass spontaneously after a few days or weeks, therefore all the more caution is indicated if it continue. Recently Abt, Aschenheim and H. Finkelstein have added new investigations to pediatrics on the relation of albumen diet and water requirements. If diarrhea and vomiting have exhausted the water content even children with normal gastro-intestinal conditions become feverish. If much albumen is given care must be taken to supply sufficient water not only for digestion but also for the rest of the body function, or the renal function will be disturbed, and urea become excessive.

ABT, A., ASCHENHEIM, ELSE, AND FINKELSTEIN, H. "Zur Kenntnis des alimen-tären Fiebers," *Ztschr f Kinderhk*, vol 49, pp 31-54, 1930

LEREBOUTLET, P R "Les Nourrissons vomisseurs," *Jour des prat*, vol 44, pp 83-84, 1930

MARFAN, A B "L'anorexie des Enfants du premier âge," *Jour des prat*, vol 44, pp 177-179, 1930

*What effects has the general condition of the body upon the eye?*

—For his inaugural address at Innsbruck recently, Professor Seefelder chose, not any especial phase of ophthalmology now under

discussion, but the more artistic and anthropologic problem of the beauty of the eye. Luster, color, and size, are the features first noticed on beholding a person. The luster is due to smoothness of surface of the cornea, and constant moistening by the lacrimal fluid. Most humans have brown eyes, and at birth the lighter races all have gray-bluish eyes. The size of the pupil is often misleading, creating the impression of a black iris, if it is large. All eyes are practically of the same size, it is the palpebral slit and the proportions of the orbit, and the position therein of the eyeball which give the impression of different size. At birth, the sclera is generally dirty, bluish in youth and yellow in old age. Highly myopic people have larger eyes, and there may be a basic hydrophthalmus or buphthalmus, the latter generally causes blindness. Enlargement of the front portion of the cornea is not dangerous. Expression of the eye is a result of profession and training, according to Seefelder. Age, race, and surroundings favor different responses of the eye to disease. Certain animal species are refractory to eye diseases common in man. Some races are particularly susceptible to certain eye lesions. Sometimes ocular conditions affect the sexes differently. Phlyctenula is much more common in women. In children tuberculous sclera is rare, it is seen more commonly in the young adult, while old people do not develop it. Tuberculosis of the lacrimal ducts is more common in females. Retinal periphlebitis is more often seen in men. Tuberculous iritis is rare in persons suffering from phthisis, and again the general condition of patients with tuberculous iritis is not bad. There seem to be some allergic reasons, according to Weekers. Practitioners are inclined to look for tuberculosis, if certain ocular disturbances recur at the time of menstruation, but it is not always present. Internal secretion has a marked effect upon the eye, and the eye has an especial internal secretion of its own. Changes of the uveal tract have been described repeatedly during the sexual phases of women. Szily believes that the great majority of eye lesions are due to damage sustained by the tissues or organs of the body, and not of the organs of sense proper. Diabetic iritis has been often described. Thies has seen recurrent phlyctenae and infiltration, some vicarious hemorrhages in the vitreous body, optic neuritis, and macular lesions in excess-

sively myopic patients, and severe iridocyclitis during the climacteric period. He also studied a number of cases with iritis recurring during the menstrual period, probably a consequence of ovarian dysfunction. The effect of the thyroid in exophthalmic goiter is patent. Vascular disturbances exist in conjunctival congestion of this disease, but tuberculosis and syphilis may be associated with such changes. Extirpation of the thyroid produces ocular hypertension, administration of thyroidin, hypotension. Muller observed improvement from pituitrin in cases of glaucoma. There is an iridochoroiditis of menopause, an optic atrophy of puberty. So-called albuminuria retinitis occurring in an apparently healthy individual should be a warning signal, for it has been seen associated with diminished central vision and retinal hemorrhage, by Patry. Schiotz, at the Christiania Maternity Home, found twenty-seven cases of retinitis among 132 patients with eclampsia. These are a few of the ocular involvements in generalized systemic conditions, and the true interrelation is by no means yet explained.

PATRY, ANDRÉ "L'Oeil en médecine générale," *Rev Méd Suisse Rom*, vol 49, pp 29-47, 1930

SEEFELDEE, R. "Ueber die Schönheit des Auges und den Ausdruck," *Wien Klin Wochenschr*, vol 43, pp 281-285, 1930

THIES, OSKAR "Iritis und Menstruation," *Arch f Ophthalmologie*, vol 124, pp 103-112

WEEKERS, L. "Importance du Terrain dans les Maladies oculaires," *Arch d'Ophthal*, vol 47, pp 13-31, 1930

*Are the toxemias of pregnancy understood?*—Heinrichsdorff found hepatic changes, especially fatty infiltration in fatal hyperemesis, fatty degeneration was especially marked in the center of the acini. Seitz, Mirabeou and others believe that latent or slight pyelitis is always present in late vomiting of pregnancy. Opitz thinks that all gestational intoxications constitute starvation processes, even the initial vomiting. Hunger produces abnormal metabolism, especially of acids. Determann, on the other hand, advises fasting, in severe hyperemesis he prescribed a twenty-one-day fast, and the case patient was cured. Liegner believes it would not do to let these depleted patients fast. Parallel with the infant's water paucity, he believes, goes an exsiccation in the vomiting of pyelitis, generally an expression of gastro-intestinal disturbances. Lack of

water increases glycogen catabolism in the liver, and the renewal of glycogen becomes incomplete. The degree of reaction is due to individual tolerance of loss of water. Liegner believes that increased glycogen catabolism will cause hepatic inefficiency to cope with the toxins circulating in the blood. Small amounts of urine, dry skin and decreased amount of intestinal excretion decrease the chances of eliminating the toxins. Liegner believes that the sugar metabolism should be balanced by intravenous injections of glucose, in doses of from five to twenty cubic centimeters of a 50 per cent solution. He found that the carbohydrate metabolism was improved, and acidosis overcome. Fry and Herrmann relate vomiting to the vestibular function. They believe that change of position, especially upon rising from the recumbent position induces it. Doctor Theobald at a recent meeting at the Royal Society of Medicine, at London, ruled out placental toxins and functional renal defects for eclamptic toxemia. He believes that the albuminuria so often associated with pregnancy and labor was caused by pressure or traction affecting one or both renal veins. He thinks that toxemias originate by toxins being absorbed from the intestinal tract, and that the defense powers of the body are low. Intestinal stasis brought about by the bulk of the uterus produced excess absorption of toxins. The enlargement also hindered proper assimilation of food or substances needed by the liver for defense. Ionized calcium has been found to be the most necessary blood ingredient for the function of hepatic detoxication. During the last four months of pregnancy the foetus requires large quantities of calcium, the lack of which damages the liver. Doctor Theobald is of the opinion that the damaged liver is the source of the gestational toxemias. He mentioned that lean meat and water diet in dogs had brought about death of the foetus when given at the beginning. Possibly human abortions might be referable to incomplete diet. He suggests low protein content of the diet for the pregnant with much calcium, iron, and iodin, and food rich in vitamins. There is no doubt of much erroneous feeding during gestation, just as there is at any other time. By these mistakes the endurance for labor is greatly impaired. Nalle made routine examinations of the blood of the pregnant under his care, who were women with good hygienic surroundings and apparently

adequate diet. It seemed that the physiologic demands were greatest during the seventh month, judging from the blood-picture. There was a surprising incidence of secondary anemia. Nalle recommends iron, arsenic and liver extract for the milder cases by mouth, and in the severer forms intravenous injections, possibly supplemented by blood transfusion.

FREY, HUGO, AND HERRMANN, EDMUND "Vestibular Function and Vomiting of Pregnancy," *Wien Klin Wochenschr*, vol 43, p 345, 1930

LIEGNER, B "Toxikosen am Schwangerschaftsende, Zur Aetiologie und Behandlung des Erbrechens," *Zentralbl f Gynaek*, vol 54, pp 146-152, 1930

NALLE, BRODIE C "Anemia of Pregnancy," *Southern Med J*, vol 23, p 490, 1930

THEOBALD "The Toxemias of Pregnancy," *Brit Med J*, No 3622, pp 1049-1050, 1930

*Can pyorrhea alveolaris be cured?*—In this, as in other diseases, prevention is being stressed. René Vincent says doctors should inspect gums for congestion routinely as they do for coating of the tongue. *Restitutio ad integrum* is not possible, either the tooth must be extracted, or the cul-de-sac evacuated. But early diagnosis may lead to timely opotherapy. Rousseau Decelle calls the condition *alveolysis*. The main causes are trophic changes caused by endocrin dysfunction according to present moment conception, and by infection with direct action of the pathologic agent or its toxins, upon the bone tissue. Tabes, testicular and ovarian insufficiency, myxedema, pregnancy, menopause—all are named. Vincent believes that the high ridges of the alveoli are attacked, and that the interdental septa are effected from without, from the oral cavity, or through the blood-stream. He points out that the gingival normal mucous membrane forms an obstacle for microbial invasion. Not all gingival lesions are necessarily starting points for alveolysis. Constant irritation from ill-fitting crowns or bridgework aggravates. Most often, however, internal septicemia is present. Vincent states that the bismuth and mercuric gingivites prove the eliminating function of the alveolar condition. Material taken from healthy portions of the same mouth has been found sterile. Remarkable results are claimed as obtained from autovaccins. Pyorrhea was found commonly in appendectomized persons. There is a pyorrhea of diabetes, hepatic and pancreatic changes have been found, and it

is seen in persons predisposed to staphylococcus infection Mal-occlusion favors it

VINCENT, RENÉ "Notions étiologique nouvelles sur la Pyorrhée alvéolo-dentaire, *Rev de stomatol*, vol 32, pp 65-79, 1930

*How should early abortion be managed?*—A few good suggestions, though not new, are given by Dafoe. They may prove useful reminders. Dafoe deals with early abortions occurring before the placenta has formed. Local conditions of the genital tract, or systemic inadequacy, or deficiency of pelvic structure, any of which may hinder the fertilized ovum in receiving proper nourishment for continuous growth are conducive of abortion. Partial or complete death makes the pregnancy a foreign body, and expulsion is attempted by the contracting uterus. Among the general causes are rheumatic fever, scarlet fever, typhoid, influenza, pneumonia, and less likely, renal or cardiac lesions, or syphilis, as has been believed for a long time. There may be imperfect segmentation of the blastoderm, cystic changes in the chorionic villi of the hydatidiform mole, and early hydramnios. Placenta praevia may be a cause for early expulsion, and is due to local maternal factors. The first admonition when abortion threatens is complete rest in bed and the use of sedative drugs, such as codein, morphia, and opium by mouth, or by rectal suppository, or hypodermically, to be continued for weeks. If the abortion cannot be avoided, the sooner it is completed, the better for the patient. Dafoe advises intramuscular pituitrin after the cervical canal and vagina and fornices have been packed with gauze. Often the ovum will be found twenty-four to thirty-six hours later back of the pack, and may be removed from the canal with an ovum forceps. If this good fortune fails, the uterine content may be removed under anesthesia, with the finger, the ovum forceps, or the curette. Perforation must be borne in mind in every instance. While the clearing out is in progress intra-uterine irrigation should be made with a sterile or antiseptic solution, to wash out portions of the pregnancy, and stimulate the uterine contractions. After removal Dafoe packs with gauze dipped in a solution of carbolic and glycerine 1:16. If sure that no infection exists, he packs the uterus. If the abortion has been self-induced he waits for a day, biding the development of temperatures, filling the vagina

only. If the abortion is incomplete and septic, and hemorrhage severe, packing should be avoided, and only what is loose should be removed. Fowler's position should be taken for drainage. Ergot is still recommended to keep the uterus contracted, and avoid more bleeding, and quinin is administered to increase leukocytosis, and possibly the red cells. Surgical intervention and intra-uterine irrigations are to be avoided until the temperature returns to normal. Scarlet fever antitoxin has been used with success where hemolytic microorganisms are found.

DAFOE, W. A. "The Types of Treatment of Abortions," *Canadian Med J*, vol. 22, p. 1793, 1930.

*Are there any new methods of treating bed sores?*—Barnet Joseph reports five cases of decubitus in non-diabetic patients in which the results were uniformly successful from the employment of insulin. Small doses of insulin administered once or twice a day will show good results in the course of a week or ten days.

JOSEPH, BARNET "Insulin in the Treatment of Non-diabetic Bed Sores," *Annals of Surgery*, vol. 92, August, 1930, p. 318.

# Paediatric Contributions from the Heckscher Institute for Child Health of New York City\*

## THE PROPHYLAXIS OF ASTHMA IN CHILDREN

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THE literature is replete with communications dealing with the present-day conception of the exciting factors which cause asthma. As a result of this newer conception the diagnosis and treatment of allergic conditions has been placed upon a rational basis. However, the subject matter of this communication is scarcely touched upon in the literature and is considered of sufficient clinical importance to warrant special attention.

The modern definition of asthma as it effects children differs from the old definition in that the attack of asthma is considered as belonging to the end of the phase in the asthma syndrome. Thus, asthma is a recurring dyspnoea, more marked in expiration associated with wheezing. This revised definition readily lends itself to the recognition of the earlier stages of the disease when it is frequently wrongly diagnosed as acute or subacute bronchitis.<sup>1</sup>

Asthma is quite readily diagnosed on physical examination of the patient. However, in the earlier stages of the disease, asthmatic signs are frequently lacking at the time the patient presents himself for examination. In this instance the history of recurrent wheezing or "music in the chest" is obviously of diagnostic importance. From the history it is possible to group the onset of asthma as acute or insidious. Sixty-one per cent<sup>1</sup> of the cases come under the latter group which is significant because preventive measures can be instituted in this pre-attack stage of the disease.

\* Other contributions from the Heckscher Institute will be found in this volume of the *INTERNATIONAL CLINICS* on pages 174-187 inclusive.—EDITOR.

## THE RELATIONSHIP BETWEEN THE ONSET OF ASTHMA AND THE FAMILY HISTORY

The importance of obtaining a positive family history of allergy (asthma, hay fever, eczema, angioneurotic œdema and urticaria) from the parents of the children cannot be overemphasized. Depending upon the age, age of onset, environment, nationality and even the type of allergic disease, the positive antecedent histories in children reported by various authors ranges from 42.5 to 70 per cent.<sup>2</sup> Allergic disease per se is not inherited but the "soil," "physicochemical make-up" or tendency to develop allergic disease is inherited. A child with such a predisposition, in an unfavorable environment at the proper time, will develop allergic disease.

## THE ROLE OF INTERCURRENT INFECTIONS AND DISEASES OF CHILDHOOD

The rôle played by intercurrent infections and other diseases peculiar to childhood in initiating the onset of asthma has been given special study in a series of 100 cases of asthma in children ranging in age from six months to 14 years.<sup>3</sup>

Pertussis was responsible for initiating the onset of asthma in 15 per cent. of the cases, measles in 4 per cent and scarlet fever in 2 per cent., a total incidence of 21 per cent, an incidence sufficiently striking to command attention, especially from the standpoint of prophylaxis. In most of these cases the etiologic factors in the onset of asthma were usually the inhalant proteins.

Diphtheria and varicella was not observed to initiate the onset of asthma in a single case.

*Infections of the Upper Respiratory Tract*—Acute rhinitis and bronchitis are the most common ailments of man and up to recent years they were considered solely infective in origin. In the light of our present knowledge recurrent rhinitis and bronchitis, particularly when unaccompanied by fever, are often manifestations of allergy and might be the forerunner of asthma. Infection of the upper respiratory tract superimposed on an allergic rhinitis or bronchitis adds greatly toward precipitating the onset of asthma. A history of recurrent "rhinitis or bronchitis or both" occurring in any season of the year preceded the onset of asthma in 33 per cent. of the cases.

Simple catarrhal sinusitis occurs as frequently as acute rhinitis. Since the clinical symptoms and significance of catarrhal sinusitis are essentially those of acute rhinitis, a discussion of the former in its relation to asthma will be unnecessary.

Chronic sinusitis occurs infrequently as a primary factor in the causation of asthma.

*Diseased Adenoids and Tonsils*—For many years the impression has prevailed that enlarged tonsils and hypertrophied adenoids played an important part in the causation of asthma. In more recent years and especially since the introduction of the protein skin tests, evidence has accumulated pointing to the fallacy of associating tonsils and adenoids with asthma. Tonsillectomy performed before the onset of asthma for the relief of recurrent "bronchitis," "rhinitis" or the so-called "non-infective cold" proved to be of no value, because in a great majority of these patients the symptoms were the expression of protein sensitization. On the other hand, surgical intervention was responsible for initiating the onset of asthma in 3 per cent of the cases studied.

Acute pneumonia was responsible for initiating the onset of asthma in 14 per cent of the children. In most of the children asthma commenced directly after pneumonia and in a few recurrent bronchitis followed pneumonia and persisted for six months to one year before asthma appeared.

#### THE RELATIONSHIP BETWEEN THE ONSET OF ASTHMA AND THE THE DERMATOSES

In a series of children with asthma 22 per cent had eczema, 7 per cent urticaria, and 2 per cent. angioneurotic œdema, a total incidence of 31 per cent.<sup>4</sup> Urticaria and angioneurotic œdema secondary to an eczema were not included in these figures. Eczema always commenced during infancy and always preceded the onset of asthma, varying from one to seven years. Angioneurotic œdema was concurrent with, or set in after, the onset of asthma. Urticaria usually occurred after the onset of asthma. Children with eczema frequently exhibited cutaneous hypersensitivity by test to various foods and at times to one or more biologic food groups such as fish, meat, cereal grains, etc. These facts suggest the possibility of employing the knowledge in the prevention of asthma. These children

should be tested further with pollen and inhalant proteins. A goodly proportion of these subjects will show sensitization to inhalant substances which have a more direct bearing on the etiology of asthma. The elimination or avoidance of these sensitizing substances may prevent the onset of asthma.

#### THE RELATIONSHIP BETWEEN THE INJECTION OF FOREIGN PROTEINS AND ASTHMA

With the growth in popularity of the application of therapeutic (horse) serums and nonspecific antigens (milk) it is more important than ever not to relax our efforts to search for a possible sensitization in every patient about to be injected. Several patients have come under my care in whom the injection of diphtheroid, tetanus or scarlet fever antitoxin were responsible for initiating the onset of asthma associated with varying degrees of anaphylactic shock.

#### NONSPECIFIC FACTORS AND ASTHMA

In a child predisposed to allergy, various nonspecific (non-allergic) factors may be responsible for hastening the onset of asthma. Physical over-exertion is probably one of the most important nonspecific factors.

Indiscretion in diet, such as overeating, eating hurriedly or the eating of improperly prepared food, are factors that play some rôle. The ingestion of such food as sweet corn, cheese (except cream cheese), goose, turkey, pork, ham, radish, mustard, cucumber, pickle, bean, cooked cabbage, mushroom, parsnip, squash, pumpkin, turnip, sweet potato, herring, salmon, sardine, bluefish, tunafish, berries of all kinds, grape, cherry, raw peach, melons and delicatessen food are predisposing factors of asthma. The drinking of iced liquids and the eating of ice cream are harmful. When the body is overheated following exertion, the drinking of iced liquids may initiate the onset of asthma of a severe degree. This practice is naturally most common during the summer months.

#### CONCLUSIONS

1. The present-day knowledge of allergy makes it possible to institute preventive measures in those children with a predisposition to develop asthma.

2 The recognition that asthma in children is a recurring dyspnoea associated with wheezing, and, that the attack of asthma belongs to the end of the phase in the asthma syndrome, will lead to the diagnosis of the earlier stages of the disease, during which period preventive measures can be instituted against the "attack" stage of the disease

3 If a child contracts pertussis, measles, scarlet fever, pneumonia or requires an operation for an adenoidectomy or tonsillectomy and there is an allergic family history, especially with an antecedent eczema, angioneurotic œdema or "recurrent bronchitis and rhinitis," the elimination of the known sensitizing substances from the diet and environment may possibly prevent the onset of asthma.

4 In infants and young children with eczema reacting to various foods or to one or more biologic food groups, it may be possible to prevent asthma by further tests with pollen and inhalant substances and by the elimination of the potential sensitizations which have a direct bearing on the etiology of asthma

5 The injection of therapeutic animal sera may be a primary causative factor of asthma Skin tests with horse serum should be performed in every person before the administration of therapeutic serum is attempted

6 Various nonspecific (nonallergic) factors may be responsible for hastening the onset of asthma in a child predisposed to allergy

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## THE FUNCTIONS OF VITAMINS IN NORMAL NUTRITION

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IN AN organism as complex as the human body there is always the chance of something going wrong—some bacterial invasion, some failure of coordination, some accidental lesion, hence there is always need of the best possible medical service. But there is an ill-defined borderline between sickness and health which is far wider than necessary. Too many people, not classified as sick are far from optimum health. Often they are not aware of this themselves and accept their status as inevitable giving no consideration to their potentialities for greater vigor, better mental poise and more general efficiency.

Among the factors which may improve individual and community health none is more far-reaching in its effects than food. For the past twenty-five years scientific evidence has been accumulating with regard to the control over well-being exerted by the various dietary factors recognized as essential. The discovery of a specific food factor which will prevent or cure beriberi, of another which will do the same for scurvy, and of a third specific in rickets, has stimulated investigators to seek other substances which in infinitesimal amounts might prove indispensable to the maintenance of health. Just as the dog has served as a means for the study of diabetes mellitus and the discovery of insulin, so the albino rat has proven of inestimable value in determining the nutritive properties of food materials and the influence of diets of many types upon whole families through many generations. Thus we have come to appreciate how insidiously a bad diet may undermine a good constitution and also how, through months and years, a good diet may increase vigor and resistance to infection and contribute to what we generally call vitality.

Most prominent among the substances of which infinitesimal amounts are significant is the group now widely known as vitamins.

Chemically and physiologically these are as highly individualized as the group styled the mineral salts. An impressive array has already been identified and prepared in high concentration—vitamins A, B, C, D, E, and G—with very definite indications of others still to be identified. Originally of interest because of their power to cure certain deficiency diseases, they now command the attention of every one because the amounts which are sufficient to protect from the recognized deficiency diseases are far less than the quantities needed to induce the best growth, maintain the highest vigor of the adult, and promote the most successful reproduction and lactation.

#### VITAMIN A

Vitamin A, first recognized as a cure for xerophthalmia, is now known to be more directly related to resistance to bacterial infection than any other food factor. In fact, E. Mellanby<sup>1</sup> has recently suggested after many years' experience, that it might well be rechristened the anti-infective vitamin.

Shortage of Vitamin A causes many pathological changes which can be readily studied by controlling the dosage. The epithelial tissues are the ones primarily affected, and the characteristic phenomenon is their transformation into a stratified squamous keratinizing epithelium. This change occurs in the nasal passages, larynx, trachea and bronchi, with an actual diminution of the vitamin A content of the lung tissue, and frequently with lung infection.<sup>2, 3</sup> Corresponding changes in the kidney predispose to phosphatic calculi<sup>4, 5</sup> and in the intestines to abdominal distention and diarrhoea, the walls being reduced to a thinness resembling that occurring in children suffering from celiac disease.<sup>6</sup>

The level of intake of vitamin A during early life may markedly influence subsequent susceptibility to infection.<sup>7</sup> Recently E. Mellanby<sup>8</sup> has reported the recovery of a number of cases of puerperal septicemia treated with vitamin A. As Sherman<sup>9</sup> has pointed out, the fact that like deficiencies of the vitamin A in food are not always followed by like effects is largely due to the important degree to which this substance may be stored in the body. "Experimental animals alike in all other respects and fed different amounts of vitamin A may show differences either early or late, according to the extent of the dietary deficiency and the differing opportunities

which have been afforded to the animals to acquire a bodily store in advance of the period of dietary deprivation.” All recent investigation emphasizes the remarkable capacity of the tissues for the storage of this vitamin and the value of liberal reserves in the maintenance of optimum health throughout life. Average age at death declines as the vitamin A content of the diet is lowered.<sup>10</sup> It should also be remembered that the proportion of vitamin A sufficient to bring the adult to maturity and maintain good health for a considerable time, may be insufficient for successful reproduction and lactation.<sup>11</sup>

Because so many of our energy and protein bearing foods are poor in this vitamin, it is important to know and use regularly some rich sources. Eggs and milk are better sources than any body tissues, and thin green leaves may be as rich, weight for weight, as egg yolk or butter fat.\*

#### VITAMIN B

What was known as vitamin B in the early days of vitamin research has since been shown to be a composite of several vitamins one of which has now been identified as antineuritic (B), and another as anti-pellagric (G). Others await fuller investigation. As in case of vitamin A, the most significant function of vitamin B in the ordinary dietary is not the prevention of polyneuritis (beriberi), which can be accomplished with a comparatively small amount, but the maintenance of normal nutrition at all ages which recent investigation has shown can be achieved only by generous quantities.

The effects of a low intake of vitamin B are related to the alimentary tract, the endocrine system and the nervous system. The modern complaint of anorexia in children fed with the most scrupulous care has been attributed by Hoobler<sup>12</sup> and Dennett<sup>13</sup> largely to inadequate vitamin B. McCarrison<sup>14</sup> has repeatedly emphasized his observation that many digestive disorders have been relieved by a liberal intake of vitamin B and very recently Fletcher and Graham<sup>15</sup> have found in cases of chronic arthritis with debilitated colon and severe constipation, that by giving vitamin B freely they produced great increase in tonicity, with definite deepening of

\* For information regarding the amounts of vitamin A in foods which have been investigated, consult Sherman's Chemistry of Food and Nutrition (1920) or Rose's Laboratory Handbook for Dietetics (1929) the Macmillan Company.

the haustral markings, as demonstrated by repeated X-ray observations

The indispensability of vitamin B for growth is generally recognized, but the close relationship between rate of growth and requirement is a matter of recent appreciation. Dennett<sup>11</sup> has demonstrated the better growth of babies when the vitamin B content of their diet is definitely increased with wheat germ extract and Morgan<sup>16</sup> has reported that underweight children from 11 to 13 years of age made remarkable gains in weight and significant gains in height when extra vitamin B in the form of wheat germ was incorporated in their daily bread.

Disturbances of the nervous system of suckling rats whose mothers were fed diets high in protein and low in vitamin B have been reported by Hartwell<sup>17</sup> and others, but not confirmed by extensive work of Sherman and Gloy<sup>18</sup>. An interpretation is now offered by Daniels,<sup>19</sup> who finds that animals receiving low protein diets to which have been added glycine or alanine, amino acids known to have a stimulating effect upon the metabolic process, exhibit symptoms similar to those young of mothers receiving high diets, whereas the young of animals receiving the low protein diets with glutamic acid additions (an acid which does not stimulate metabolism) developed normally. When yeast was added to the low protein diet along with alanine or glycine the young developed normally. It appears therefore, that there may be a need for more vitamin B on diets which increase the metabolic rate owing to the action of certain amino acids.

Daniels<sup>20</sup> found that the young animals manifesting untoward symptoms on high protein diets low in vitamin B also gave evidence of abnormal glandular development. The thymus was much smaller than in normal controls of the same age, and the thyroid much larger. Similar results were found with the diets low in protein and vitamin B to which alanine or glycine had been added.

From quantitative data now available, it appears that it is less easy than formerly thought to secure a liberal supply of vitamin B in the ordinary diet. Milk is relatively richer in vitamin A than in vitamin B, and although a liberal amount will go far toward guaranteeing adequacy of vitamin B, it must be supplemented by larger quantities of vegetables and fruits than people generally are accustomed to eat. As an additional safeguard, it is very desirable to

include in the daily diet whole grains, whose germ and bran contain vitamin B, or as suggested by Morgan,<sup>16</sup> to recover the germ from the millers and restore it to the bran-free bread. The situation is well stated by the Committee on Nutritional Problems of the American Public Health Association.<sup>22</sup> "We wish to emphasize, however, the need for full recognition of the importance of conserving the natural vitamin values of foods to the fullest possible extent, and of frankly acknowledging that every diminution of vitamin content is a diminution of food value. Up to the present we have, perhaps, been too complacent on this point, tending sometimes to evade serious consideration of it on the ground that "we will probably get enough of the vitamin in our liberal mixed diet anyway." But we do not ignore the abstraction of a part of the cream from market milk on the ground that the partially skimmed milk is still an excellent food and that our mixed diet would probably furnish us enough fat anyway, we recognize that to whatever extent the milk-fat with its vitamin A is diminished, to that extent the food value is lowered. So we should recognize with equal clarity and frankness that when much of the vitamin B of wheat or rice is removed in milling, or much of the vitamin C of cabbage or spinach is lost in cooking or canning, to that extent there is a diminution of food value, however excellent the resulting product may be, and however likely that at least our minimum requirements for vitamins will be met."

#### VITAMIN C

The discovery of vitamin C resulted from experimentation with diets which produced scurvy and the study of those foods which were found curative. Today highly potent extracts are prepared of this vitamin, as well as of vitamins A and B.

The amount of vitamin C required to prevent human scurvy is quite small and has led to an easy confidence that in the ordinary mixed diet there is little danger of shortage. But as in case of vitamins A and B, the amount which can be profitably used is many times greater than the scurvy-preventive requirement. Even the white rat, which can dispense with any dietary source of preformed vitamin C, grows more vigorously when orange juice is added to the diet.<sup>23</sup> Hess<sup>24</sup> found that infants without pronounced scurvy

symptoms were irritable, lacking in stamina and failing of optimum growth, when given a minimum of antiscorbutic food

Among the body changes noted on a scorbutic diet have been certain alterations in the teeth<sup>25, 26, 27</sup> Hojer<sup>28</sup> found that in three weeks on such a diet guinea pigs' teeth show such characteristic changes that the teeth become one of the most sensitive means of testing foods for vitamin C, an observation confirmed by Wolbach and Howe<sup>27</sup> and by Eddy<sup>29</sup> Among the most prominent changes are deterioration of the pulp, which shrivels and shrinks away from the dentine, while the space between becomes filled with fluid and the dentine itself gradually liquefies, finally being completely destroyed Microscopically the first changes appear in the odontoblasts which normally stand in an orderly row between pulp and dentine, but speedily fall into disorder when there is any lack of vitamin C Upon administration of vitamin C improvement may be noted within 24 hours, while within a week the odontoblasts may regain their normal position and begin the construction of new dentine It has been found by Hojer<sup>28</sup> and by Eddy,<sup>29</sup> that twice as much vitamin C is required by a guinea pig for tooth protection as for protection against the common signs of scurvy, such as hemorrhages into the joints, muscles and intestines, beading of the ribs and softening of the bones and teeth

Confirmatory evidence of the value of vitamin C for human teeth is rapidly accumulating Boyd and Drain<sup>30</sup> discovered that certain hospitalized diabetic children exhibited carious teeth in which a gradual hardening of the areas surrounding the carious spots took place and thereupon established a control group of pre-school children to determine the relation between this phenomenon and the diet On a diet high in minerals and vitamins, caries was in every instance arrested and there was no new dental decay Bunting<sup>31</sup> has also made extensive studies of the influence of diet upon children's teeth as compared with thorough treatment of the mouth with an antiseptic wash, and has found that the wash had little influence, while the beneficial effects of a carefully ordered diet were very striking The diet prescribed contained daily one quart of milk, green vegetables and fruit, with no sugar on cereals or in beverages, very little sweetened preserves and pastry and little or no candy Bunting calls attention to the fact that whether

present investigators believe that the caries control occurs as the result of a decrease of aciduric bacteria in the mouth, or the increase of salivary alkalies, or the hardening of the tooth, all have found practically the same kind of dietary procedure effective. He says "Whether or not all may agree with the rationale of this procedure, it is interesting to note that the children so fed grew normally, were in good health and were notably free from common colds and other infectious diseases. In them, also, dental caries was almost completely arrested." Since defective teeth have been reckoned one of the common causes of malnutrition among school children, the value of these findings can scarcely be over-estimated. Far better than an expensive remedial dental program would be one which by dietary improvement not only would control dental caries but at the same time promote growth and health in other ways.

#### VITAMIN D

Chemically, knowledge of vitamin D has advanced farther than that of any other vitamin. It has not only been prepared in highly concentrated form from natural food materials but has also been made by the action of ultraviolet light upon pure ergosterol, in which form it is now called viosterol. In a sense vitamin D is not necessarily a dietary factor, since it can be developed in the living body through the direct action of ultra-violet light upon the ergosterol in the skin. In sunny tropical regions it is not a health problem. But where, because of climatic conditions or modes of living people are little exposed to direct sunshine, rickets will be prevalent unless special measures are taken to prevent it. Then the fact that some natural foods, such as cod and other fish liver oils, eggs, milk and butter, are good sources of vitamin D becomes nutritionally important, and the power to increase the antirachitic property of various types of staple foods, including milk, fats of vegetable as well as animal origin, and all kinds of cereals, takes away the last excuse for letting this ancient scourge of childhood longer prevail.

Vitamin D is the prime regulator of the calcium-phosphorus metabolism. There is considerable evidence that its influence is exerted more directly upon the parathyroid glands. Hess and Lewis<sup>62</sup> found that in case of a monkey in which latent tetany had

been maintained for several months by means of a low calcium diet, large doses of irradiated ergosterol raised the serum calcium to a normal level, but after the removal of the parathyroids the calcium fell again and could not be raised by repeated doses of the irradiated ergosterol. In chicks, deprivation of vitamin D results first in hyperplasia and then in degeneration of the parathyroid glands.<sup>33</sup> Greenwald<sup>34</sup> believes that he has demonstrated stimulation of the glands by cod-liver oil, since similar effects on calcium excretion are produced in a normal dog on a low calcium diet by administration of the oil and of parathyroid extract.

While deformities of the bony framework are the most conspicuous feature of rickets and may lead to permanently short stature, contracted thorax and (in girls) contracted pelvis, it is with the phenomena of mild rickets more insidiously menacing health that the nutritionist is most concerned. Poor muscle tonus, fretfulness, restlessness, listlessness, impaired digestion and the like predispose to other diseases. According to Gamble,<sup>35</sup> "Rachitic children are notoriously predisposed to dangerous gastro-intestinal disturbances and to the contraction of infectious diseases, especially of the respiratory tract." Of widest significance for health, perhaps, is the influence of a shortage of vitamin D upon the teeth. The extensive studies of May Mellanby<sup>36</sup> on rachitic puppies have shown startlingly defective teeth, late in erupting and irregularly set in the jaw, the jaw bone itself very spongy, and the calcium content of the teeth very low. That defective teeth are the precursors of decayed ones has also been shown by examination of more than a thousand deciduous teeth of English children. Seventy-three per cent of defective first molars were over 80 per cent carious, and 92 per cent of defective second molars were 87 per cent carious. A group of about 125 English children under twelve years of age were fed for a period of from five to eight months liberal amounts of vitamin D, either in form of milk, eggs and cod-liver oil or as irradiated ergosterol, this very definitely arrested the spread of decay in the children's mouths, temporary and permanent teeth sharing alike in the improvement.

In pregnancy and lactation liberal supplies of vitamin D are important for maintaining the calcium reserves of the mother's body as well as for the developing teeth of the fetus. Blunt and Cowan<sup>37</sup>

have recently reviewed the literature in this field and summarize as follows "There thus seems to be little doubt that for women as well as for animals during pregnancy and lactation, care of the diet, including cod-liver oil, and exposure to sunshine are vitally important for safeguarding the maternal organism and are also of significance to the offspring"

#### CONCLUSION

An attempt has been made to show that the four vitamins, known as A, B, C, and D, respectively, are required for optimum health in amounts far greater than those which will suffice to prevent acute deficiency diseases. Chemical investigation has made available concentrated preparations of all four, and those for vitamins A, B and D are now commercially prepared. For individual cases and for special purposes, these concentrates have undoubted value. But the majority of people would find them too expensive, or would be too negligent of their own best interests to use them regularly. It is highly important, therefore, that children be habituated, from infancy on, to a diet composed of food materials which will carry, along with calories, protein and mineral elements, a rich supply of vitamins A, B, C, and either of D or a regular daily exposure to sunlight. One of the simplest steps in the achievement of such a diet is the inclusion of a liberal amount of whole cow's milk. Next comes a regular allowance of orange juice or tomato juice, or their equivalent in vitamin C, accurately determined, not left to chance. Then the use of large portions at each of two meals, of at least two vegetables and two servings of fruit. Some butter is desirable as an additional source of vitamin A, and regular use at least once daily of some whole-grain cereal, either as bread or "breakfast food." In temperate regions, a small daily portion of cod-liver oil is an additional safeguard as regards both vitamin A and vitamin D.

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# THE DIAGNOSIS OF EARLY ORGANIC HEART DISEASE IN CHILDREN

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ONE of the most frequent questions that arises in the physical examination of children is "Is the cardiac murmur heard in this child significant of organic heart disease?" Very often the answer is difficult to find, yet a correct interpretation is of the utmost importance. A mistaken diagnosis of organic heart disease may blight the life of the child by hedging it in with unnecessary restrictions, and making it unduly heart conscious, but failure to recognize an actual lesion may favor the progress of the disease owing to the neglect of measures that might safeguard the patient. The answer to the question posed above will be found not in refinements of auscultation, but rather in a knowledge and understanding of the etiology and natural history of heart disease in childhood.

By far the most frequent cause of cardiac lesions in children is rheumatic fever, indeed, with the exception of congenital heart disease, other causes are so rare that they need not as a rule be considered. If, then, we understand the clinical and pathological manifestations of rheumatic fever, we should be in a position to cope with most of the cases ordinarily encountered. Rheumatic fever is a general infectious disease with protean manifestations involving not alone the heart, but the upper and lower respiratory tracts, the joints, the visceral membranes, the fasciae, the small arteries and the brain. It is characterized by its chronicity and by the frequency of reinfections, and by the fact that in from 80 to 90 per cent of cases in children under the age of ten the heart becomes involved. But rheumatic heart disease should be regarded as an incident in a general rheumatic infection. It would be most helpful if we acquired the habit of speaking not of a child with mitral insufficiency, for instance, but of a child with rheumatic infection and cardiac involvement. In the heart too, the infection is chronic and pro-

gressive, and marked by frequent recurrences, so that it is not enough to establish the presence of a heart lesion. One must determine whether it is arrested or progressing. This can be learned only by a study of the child as a whole, by a search for some of the manifold manifestations of rheumatic fever, not by a study of the heart alone.

The two diagnostic problems most frequently encountered are whether certain signs and symptoms, especially murmurs or tachycardia, are signs of organic heart disease, and whether, during a febrile episode, particularly one with rheumatic manifestations, the heart is affected.

#### THE INTERPRETATION OF MURMURS

Given a child with a systolic apical murmur, how will one proceed to determine its significance? Of prime importance is a careful history. One must enquire not alone for the grosser manifestations of rheumatic infection such as arthritis, tonsilitis, or chorea, but for the more insidious complaints such as growing pains, muscle pains, torticollis, nodules, and even periods of vague ill health with malnutrition and anaemia, or fever. A positive history will lend significance to a murmur which otherwise might be ignored. This is well illustrated by the following case.

H. F., a boy 11 years of age complained of slight dyspnoea on exertion for seven months, and occasional precordial pain on running. Since the age of 2 he has had many attacks of joint and muscle pains, with joint swelling of only moderate degree, but no redness. He had many attacks of tonsilitis until a tonsillectomy was performed four years ago. On examination the heart is not enlarged, and fluoroscopy shows it to be of normal size and shape. The heart sounds are good, the second pulmonic sound is reduplicated. There is a short soft systolic murmur at the apex, not transmitted, which is unaltered with change of position or after exercise. In this boy, a short systolic murmur, without cardiac enlargement or other signs is interpreted as evidence of rheumatic valvular disease with mitral insufficiency, solely on the basis of the history. In the absence of a rheumatic history the murmur would be considered functional.

The general appearance of the patient, the pre-  
100

of cyanosis, pallor or dyspnea, of bulging of the chest wall in the region of the precordium must be noted. Of physical signs, the determination of the size and shape of the heart is the most important. In the cases of early valvular disease this can be accomplished only by fluoroscopy. With this method, properly executed, one can identify the individual chambers of the heart and ascertain whether or not any one of them is enlarged. An adequate fluoroscopic report must include a statement of the appearance of each ventricle and auricle as well as of the aorta, and the relations of these parts to the surrounding mediastinal structures. Vague statements, such as "enlargement of the heart," "mitralization" and the like are deceiving and should be avoided.

A. G., a girl aged 8 had no rheumatic history nor symptoms of heart disease. She had a systolic murmur at the pulmonic area louder in recumbency than in the upright posture, as well as a systolic murmur at the apex which was transmitted to the axilla and which was loudest in the sitting posture. A third heart sound was audible. Fluoroscopy revealed slight but definite enlargement of the ventricle in both the anterior and oblique positions. The other chambers were normal. In this case, in spite of the absence of a rheumatic history, left ventricular enlargement associated with an apical systolic murmur justified the diagnosis of mitral insufficiency, probably of rheumatic origin.

The quality and character of the heart sounds are more likely to lead one astray than to be of assistance in the diagnosis of early lesions. The first sound is rarely altered. Accentuation of the second pulmonic sound is so common in children normally that it cannot be employed as evidence of a mitral lesion. Most deceptive is the third heart sound. As Thayer<sup>1</sup> and others have shown, the third heart sound occurs early in diastole immediately after the second sound, giving a triple rhythm to the heart sounds. It is supposed to be due to the vibration of the auriculoventricular valves induced by the sudden inrush of blood from the auricles in early diastole. The third heart sound is heard in about 80 per cent of children. It is best audible with the patient in the recumbent position, particularly if he lies on his left side. Frequently it cannot be heard with the patient upright, but appears on recumbency, it is characterized by a certain inconstancy. Difficulty in diagnosis arises

because the physiological third heart sound resembles closely the reduplication of the second sound heard so frequently in patients with mitral stenosis. In early mitral stenosis this reduplication of the second sound is a valuable sign. It may precede the appearance of a presystolic murmur. In a child with an apical systolic murmur and a physiological third heart sound one may readily fall into the error of diagnosing the presence of a mitral stenosis. In children, therefore, a third sound at the apex cannot be used as a criterion for the presence of mitral stenosis in the absence of a diastolic or presystolic murmur. The reduplication of the second sound in mitral stenosis is often heard at the pulmonic area, and when this occurs it may be differentiated from the third heart sound. It is also brought out by exercise, and in this differs from the third heart sound. But like the third sound it is best heard with the patient in the recumbent posture.

#### MURMURS

Murmurs must be studied carefully in respect to their site of maximum intensity, their transmission and their place in the cardiac cycle. Furthermore their character with the patient in the sitting and recumbent postures, after exercise, as well as on deep inspiration and expiration must be noted. The loudness or harshness of a murmur does not help in classing it as organic or functional in origin. Its constancy and persistence is of much greater importance.

A good example of this is shown in the case of — a girl of 10 who was referred for cardiac study because her physician in a general examination had noted a rapid heart rate and a short presystolic murmur. On examination the heart was of normal size and shape as checked by fluoroscopy, and the child gave no history of rheumatic infection. At the apex was heard a very harsh systolic murmur not transmitted. Because of the absence of all other signs of cardiac affection, and with no rheumatic history it was concluded that there was no valvular disease and that the murmur was functional, although some of the doctors who examined the child felt that such a loud harsh murmur must signify valvular involvement. The child was reexamined a few weeks later. The harsh murmur had disappeared and there remained only a very soft systolic murmur.

at the apex, and everyone then agreed that the child had no organic disease

Systolic murmurs are heard most often at the pulmonic area. They are, as a rule, not widely transmitted, and vary in intensity with respiration. They diminish in intensity or disappear with inspiration and become louder with expiration. They are due to pressure of the thorax on the pulmonary artery and conus during systole. In deep inspiration the lung cushion intervenes and abolishes the murmur.<sup>2,3</sup> Thus such murmurs are not indicative of heart disease. Only when a rough pulmonic murmur is accompanied by a thrill and other evidence, such as cyanosis or cardiac enlargement, can a suspicion of congenital pulmonic stenosis be entertained.

Apical systolic murmurs are frequently transmitted from the base. They may vary with respiration and be cardiorespiratory in origin. In the presence of anaemia, the increased fluidity of the blood passing through the normal valvular orifices may give rise to a systolic murmur. All of these functional murmurs tend, not alone to vary with respiration but with change of posture, as well as with repeated examinations on different days. Systolic apical murmurs caused by valvular disease are more constant. They usually are transmitted to the axilla and to the back, and often one can find signs of enlargement of one or more chambers of the heart.

Whereas systolic murmurs in the majority of cases are not indicative of organic heart disease, diastolic murmurs with few exceptions are heard only in the presence of definite valvular lesions.

The character of the pulse gives little information during the early stages of valvular heart disease. The heart rate or pulse rate is of greater value. Persistent tachycardia may be the only sign of rheumatic myocarditis. In evaluating the significance of tachycardia one must be certain that it is genuine, and not conditioned by apprehension or excitement. The best test is to count the pulse while the patient is sleeping. A tachycardia due to rheumatic myocarditis will persist, while one that is nervously conditioned will disappear during sleep.<sup>4</sup>

A 14-year-old girl complained of vertigo, palpitation and dyspnoea on exertion. Physical examination was negative except for a pulse rate ranging between 100 and 140 and moderate pallor. A diagnosis

of rheumatic myocarditis was seriously considered until a cardio-tachometric study of the heart rate revealed a minimum rate of 64 during sleep. In another girl with a genuine rheumatic carditis the heart rate never went below 103 during sleep.

Symptoms of dyspnoea, palpitation and precordial pain are rare in the early simple valvular lesions, unless an active infection of the heart is present. They occur more often in association with the functional disorder termed neurocirculatory asthenia. This syndrome in children is encountered most often near the age of puberty, and not infrequently is associated with orthostatic albuminuria.

The electrocardiogram is of little value in establishing a diagnosis of early organic heart disease except in the presence of an active myocarditis.

#### RHEUMATIC CARDITIS

During the course of a febrile rheumatic episode, whether it is manifested by arthritis, chorea, or just by fever, muscle pains and progressive anaemia, it is important to determine whether the heart is involved in the infection. This is by no means easy. All of the criteria discussed above must be employed in the attempt to establish organic cardiac involvement. However, in the earliest stages, valvular lesions are not sufficiently developed to give convincing physical signs, and the lesion of most importance to the immediate welfare of the child is a myocarditis. Owing to the established frequency of myocarditis in rheumatic infection in children (80 to 90 per cent.), involvement of the heart must be assumed unless it can be disproven. Characteristic features of rheumatic myocarditis are a heart rate more rapid than the degree of fever would seem to warrant. At times a pericardial friction rub provides the looked for evidence. Not infrequently fever and leucocytosis persist after the subsidence of all external evidences of rheumatic infection. In such cases, particularly if the pulse is rapid, cardiac infection may be assumed.

The electrocardiogram gives valuable assistance in the diagnosis of rheumatic carditis.<sup>5, 6</sup> Impaired auriculoventricular conduction and alterations in the ventricular complex are commonly found. However, repeated electrocardiograms must often be taken, for these changes are often transient. With careful and frequent observation,

electrocardiographic signs of muscle disease will be found in the majority of cases of rheumatic carditis. Not uncommonly, the electrocardiographic tracing offers the sole evidence of myocardial involvement. These signs may persist long after gross evidence of the infection has disappeared.

The frequency of heart disease and of functional murmurs in a group of presumably healthy children is well illustrated by a preliminary analysis of the protocols of the first 1028 children examined at the Heckscher Institute for Child Health. These children were examined in a general pediatric clinic and all of those in whom any cardiac abnormality was noted were referred to the heart clinic for further study. Of the 1028 children, 68 or 6.6 per cent. were referred to the heart clinic. Only 40 of these kept their appointments and were examined. The following diagnoses were made in these 40 children.

No heart disease	27
No abnormal physical findings	5
Functional systolic murmur	20
Neurocirculatory asthenia	1
Potential heart disease	1
Rheumatic heart disease	12
Mitral insufficiency	7
Mitral stenosis	5
Congenital heart disease	1

Thus, only 32 per cent. of the children in whom suspicion of heart disease had been aroused had organic lesions. Accepting the proportion of rheumatic heart disease found among the 40 children examined, and allowing for those who did not appear for examination, we find that 1.9 per cent. of the 1028 children had rheumatic heart disease, and a little over 0.1 per cent. had congenital heart disease. This corresponds rather well with similar statistics published elsewhere.

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## UROLOGICAL EXAMINATIONS OF CHILDREN

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UROLOGICAL examinations of children may be classified broadly into two groups, 1 The examination of the apparently healthy child, and, 2 The examination of the child which is ill

### 1 EXAMINATION OF THE APPARENTLY HEALTHY CHILD

The field of preventive urology is extensive. As yet it has not been cultivated by those best qualified to produce results. The pediatrician is quick to recognize deviations from the normal, but the urologist is more capable of evaluating their importance. It is he who has traced many major disorders of the adult genito-urinary tract to seemingly insignificant abnormalities, easily remedied during childhood. It is unlikely that a urologist will perform amputation of the penis for cancer very many times before he will insist upon the circumcision of all boy babies, nor after observing the highly malignant nature of a testicular teratoma can he view complacently an undescended testis. Unfortunately in the past few urologists have had the opportunity of building up a service from children's wards, and many pediatricians have appeared reluctant to request the assistance of our specialty. It is most encouraging to note the rapid progress being made toward rectifying this situation.

In examining healthy children the use of specialized urological instruments plays but little part. With no symptoms of disease in any of the genito-urinary organs, the examination is performed for the most part by inspection and palpation. Occasionally transillumination is of great value. On the whole the work consists mostly in discovering congenital anomalies. A convenient working chart follows.

Kidney

~  
F

## Testis

Anorchism  
Monorchism  
Degree of Descent  
Atrophy  
Anterior Inversion  
Spermatic Cord and Tunica Vaginalis  
Cysts  
Hydrocele

## Penis

Absence  
Double  
Webbed  
Hypospadias  
Epispadias  
Hermaphroditism  
Pseudo hermaphroditism  
Phimosis  
Stricture of Meatus

## 2 EXAMINATION OF THE CHILD WHICH IS ILL

While the use of urological instruments is not justified in the examination of healthy children, proper care of the ill child can only be based upon an accurate diagnosis. With the accumulation of experience on the subject, there seems to be less and less difference between the urological examination of a child and that of an adult. If symptoms are present which require urological investigation, the examination should be performed regardless of the patient's age. Equipped with any one of several excellent small sized cystoscopes, the well trained urologist recognizes no essential contraindication in performing cystoscopy and bilateral ureteral catheterization on even a new-born boy baby. Of course with children a general anesthetic is required, but this need not be deep or of long duration. Cystograms with the bladder filled with sodium iodide or pyelograms with the use of the same solution are not at all unusual. In suitable cases pyeloureterograms can be obtained easily by injecting sodium iodide solution into the bladder and suspending the infant by the feet. Functional tests of the kidneys based upon the excretion of suitable dyes may be performed without extra hazard.

Since the advent of uroselectan it has been possible to carry out thorough examinations of the urinary tract in children without employing the cystoscope. Reliable data may be obtained relative

to kidney function, and accurate outlines of the renal pelves, the ureters, and the bladder are produced. Moreover, the renal parenchyma is clearly visualized. Thus it is a simple matter to discover any of the many possible developmental anomalies such as horse-shoe kidney, reduplication of ureters, or accessory organs.

It is remarkable how many diseases, commonly associated with adult life, may be revealed in the genito-urinary organs of children by proper methods. Infections are common. Calculi are not at all unusual in bladder or in kidneys. Vesical diverticulae are being recognized with greater frequency, while malignant tumors were well described generations ago.

In conclusion I recommend a closer contact between the pediatrician and the urologist. Modern urology has perfected many valuable procedures applicable to the child among which the diagnostic methods are often indispensable.

# Medical Trend

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"Wherefore I perceive that there is nothing better, than that a man should rejoice in his own works, for that is his portion for who shall bring him to see what shall be after him?"

—ECCLESIASTES, chapter III, verse 22

## THE WINNIPEG MEETING OF THE 1930 BRITISH MEDICAL ASSOCIATION

FOR the third time in its ninety-eight years of continuous and continuing usefulness, the British Medical Association holds its scientific session in Canada, at Winnipeg, Manitoba, the session of 1897 having taken place at Montreal, and that of 1906 at Toronto. As it was my good fortune at the end of the last century to attend the Montreal meeting as the editor of the *International Medical Magazine* and to have had a chance meeting with Doctor Osler, while there, it would seem to be an opportune time to republish my account of the Montreal meeting which appeared in the September, 1897, number of the *International Medical Magazine*, as did also the addresses of Roddick, Richet, Osler, Banks, and Biggs, and to report a few notes jotted down shortly after Doctor Osler's talk with me on August 31, 1897. But would that I had been a better Boswell in recording what he told me at that time and what he used to talk about at the close of his Wednesday clinics at the Infirmary for Nervous Diseases in Philadelphia where I acted for several years as one of his unofficial assistants!

The sixty fifth annual meeting of the British Medical Association convened for business purposes in London on July 27, 1897, and the adjourned meeting for the promotion of scientific and social intercourse was held at Montreal on August 31 and September 1, 2, and 3. About one hundred and fifty persons were present at the business session, a small attendance indeed in view of the large membership of the association—some thirteen thousand—and the importance of the questions brought up for consideration. No wonder that the council feels obliged to consult the branches for expressions of opinion in carrying on the work of the association, rather than being guided by the vote of the members

in attendance at the annual meeting! There were considered the functions of the council, the constitution of the association, the deference due respectively to a general meeting of the members and to the views of branches carefully ascertained, the obstetric nurses' bill, medical defence, and the disciplinary function of the association. Gold medals were presented to Mr. Wheelhouse and Sir Walter Foster, the Stewart prize was given to Dr. G. Sims Woodhead, and the Middlemore prize to Alexander H. Griffith. Two members were expelled from the association for having accepted salaried offices under the government of South Australia in the General Hospital of Adelaide, all the staff of which had resigned as a protest against the conduct of the government.

The Montreal meeting was opened on Tuesday, August 31, by an impressive choral service in the English cathedral at 12 M. In the afternoon the president of the council, Robert Saundby, M.D., F.R.C.P., of Birmingham, led the president of the association, Dr. Thomas G. Roddick, to the chair. Addresses of welcome were made by the mayor of Montreal, the lieutenant governor of the Province of Quebec, the Earl of Aberdeen, and others. Doctor Roddick then delivered his presidential address. On the evening of August 31 Professor Charles Richet, official delegate from the French government, delivered an address at Laval University. The sections of medicine, surgery, public medicine, obstetrics and gynecology, pharmacology and therapeutics, pathology and bacteriology, psychology, ophthalmology, laryngology and otology, anatomy and physiology, and dermatology held meetings, which were well attended, on the mornings of September 1, 2, and 3. Subjects that commanded special attention were the dietetic treatment of diabetes, arthritis deformans, the surgical treatment of appendicitis, the choice of an anaesthetic, the utility of quarantine, mandatory measures in measles, whooping-cough, tuberculosis, and leprosy, hyperemesis gravidarum, vaginal vs abdominal hysterectomy, treatment of insomnia and of syphilis, Widal's test, surgical gynecology in the insane, heterophoria, color perception, turbinotomy, and causation of the heart-beat. On Wednesday afternoon the address in medicine was given in Doctor Osler's inimitable style. He was spoken of on all sides as "our Osler," for he belongs to the entire English-speaking race, whether in America, Canada, or other portions of Greater Britain. On Thursday afternoon Mr. Mitchell Banks spoke on "The Surgeon of Old in War," and the foundation stone of a new building of the Montreal General Hospital was laid by the Right Honorable Lord Lister. In the evening the annual dinner of the association was partaken of at the Windsor Hotel. The scientific business was concluded on Friday, September 3, by an address on public medicine by Dr. Herman M. Biggs, of New York City. Social gatherings were held every afternoon and evening during the entire week.

The annual exhibit of medical and surgical appliances, which was well arranged but poorly attended, was displayed at the Victoria Skating Rink, and the pathological museum, which contained but little of interest, was prepared in one of the pathological laboratories of McGill College. In the index of the catalogue devoted to these exhibits the names of physicians showing specimens, photographs, and slides are printed alphabetically with those of commercial houses manufacturing pills, antitoxins, and surgical appliances.

The hearty welcome, the genuine hospitality, and the innumerable courtesies shown by the Canadian hosts will long be recalled by the members in attendance from Great Britain and Ireland and by their guests from the United States.

## SOME PERSONAL REMINISCENCES OF SIR WILLIAM OSLER, BART., OF CANADA, THE UNITED STATES OF AMERICA, GREAT BRITAIN, AND OF THE WORLD

On August 31, 1897, I met Doctor Osler by chance at the Montreal Golf Club at Dixie. He had been with Doctor Wilson at St Andrews, and seemed much interested in golf. He said on August 12, 1874, he returned from Europe and received word from Doctor Drake, the Professor of Physiology [Medicine?] at Magill University, that he had aortic disease and could not lecture without experiencing serious trouble with his heart. This was just six weeks before the term opened. Osler went to his home and worked as he had never done before. He was almost in despair, when the new German work by Brücke appeared. He knew that no one had a copy and that four hours of lectures a week would soon run him out of the physiology, which he knew, but said Doctor Osler, "I delivered the best course of lectures I ever delivered as I read and reread this work until I knew it by heart." Then the physician who superintended the smallpox hospital was getting too busy to attend to the work on account of an increase in his private practice and he handed over the position to Doctor Osler at one hundred dollars a month, "so with this sum I was able to live and to invest six hundred dollars in apparatus, sixteen Hartnack microscopes, sphygmographs, etc., for the professor was then obliged to furnish his own apparatus for the lectures and the small salary attached to the position still went to Doctor Drake." That Doctor Osler still retains his old love for the subject of physiology is shown by the fact that he has just returned from a week's attendance at the St Andrews meeting of the physiologic section of the British Association for the Advancement of Science. Following Doctor Osler's address in Medicine, Professor Adam and Doctor Jacobi made appreciative remarks with regard to his learning as embodied therein.

Some of these statements do not agree with those given by Dr Harvey Cushing on pages 120-123, vol 1, of his life of Sir William Osler, nor with those given later by Doctor Osler himself in the *Montreal Medical Journal*, November, vol 28, pp 823-833, 1899, and the *British Medical Journal*, January 3, 1914, where he writes, "When I returned to Montreal in September, 1874, the Professor

of the Institutes of Medicine had had to retire on account of heart disease, and instead of getting, as I had hoped, a position as his demonstrator, the faculty appointed me lecturer with the ghastly task of delivering four systematic lectures a week for the winter session, from which period dates my ingrained hostility to this type of learning. Four years in the postmortem room of the general hospital, with clinical work during the smallpox epidemic, seemed to warrant the governors of the general hospital in appointing me in 1878 full physician over the heads—it seems scandalous now—of the assistant physicians." And how must I now feel when as an assistant to Dr Henry F Formad, Pathologist at Blockley, Dr William Osler, while in Philadelphia after making some seventy postmortems in which I acted in one of them as his amanuensis, was deprived at the request of Doctor Formad, through an order of the Board of Guardians, administrating the affairs of the Hospital, of this privilege, and made them myself!

In this connection it may be well to emphasize the fact that the historian of the future will have much difficulty in sifting the true from the false with the present mode of writing biographies now in full swing. Statements such as the one which follows may make interesting "copy," but are not borne out by the facts, as in many other positive assertions made by Doctor Cushing in his life of Sir William.

"A new journal started, or an old journal revivified, was almost sure to have Osler's name as a collaborator or a contributor, or often as both. Thus the first volume of a new series of the INTERNATIONAL CLINICS under the editorship of A. O. J. Kelly begins with a paper from his pen, in which the fourteen cases of a particular form of aneurysm in his clinic were fully discussed."\*

I got acquainted with Doctor Osler in 1884, and never fully realized it until some three or four years ago. After graduating from Lafayette College in 1883 I went to Leipzig, and I arrived there when the two-thousandth number of *Fliegende Blätter* was just off the press. Among the lectures I attended in the spring semester were those of Leuckart. The outstanding feature of his lectures now is that he used to feed tapeworms to prisoners condemned to death and at postmortem see how much they had devel-

\* CUSHING, HARVEY: "*The Life of Sir William Osler*," vol. 1, Oxford, 1925, footnote, page 593

oped One day there came into the lecture room a man, not large in stature, with a brisk step, an olive complexion, and a winsome smile We entered into conversation for a few minutes and made an engagement to play tennis together that afternoon, that engagement was never kept as Doctor Osler left Leipzig suddenly on account of the flipped "four mark silver piece" coming "heads," which meant his resigning his teaching position at Montreal and his assuming his new duties in Philadelphia, confirmed by the fact that he wrote an article about his Leipzig experience in a Canadian journal of that same year

To think how education has changed! When Doctor Osler went to Philadelphia as Professor of Clinical Medicine, and I as student in medicine, we met on the grounds of teacher and taught, and it was then something new and wonderful that he should have introduced the methods of Wagner in having his students examine the patient before the class and before passing an examination for the receiving of a degree Before we graduated in 1887 we had to pass such an examination and make a diagnosis upon a patient I was taken over to Blockley and felt that if I did not pass the examination I would not graduate that year from the University of Pennsylvania. Thus in fear and trembling I walked up to my patient propped up in bed. In Europe, by-the-bye, they are just as apt to give you a normal patient Walking up to the patient to make this diagnosis which was so important in my life, I immediately looked around to see if there was a temperature chart, and there was none, and I looked for bottles of medicine, and there were none I looked around to see if there was anyone I could ask questions of, and saw only the faithful Owen, a nurse, whose knowledge of a patient was such that he knew when a postmortem would be made, way off in a corner. I had not been warned that the patient should not be questioned The circumstances were such that the only thing I could think of to do at that time was to ask the patient what medicine he was taking He said, "Je ne vous comprends pas" So I asked him in French—I had gone to school in Geneva in 1881—what medicine he was using, and he replied that he was taking digitalis Of course, the digitalis was for the heart, and I worked out the diagnosis pretty well! After I had left the patient and had gone downstairs my con-

science began to trouble me I got my degree and the only man who knows what I did, is dead, but not forgotten

It would be very much easier for me to write about the personalities of Osler than his personality Putting it in the plural I could divide him into many men I was dining with Osler one day in 1899 in Baltimore at his home and I happened to be the only guest present After dinner was over he turned to me and said, "The next ten minutes belong to Revere," and he went into an adjoining room, where I could soon hear peals of laughter, until the three-year-old kiddie was sent off to bed, and Doctor Osler returned for a serious conversation about my becoming the Director of the Ayer Clinical Hospital of the Pennsylvania Hospital of Philadelphia That is one of the personalities He was always fond of children, and children liked him He always had a little boy friend and a little girl friend. We all know the broken heart of the man when he was deprived of his only son.

Osler could say things no one else could say without offense He could scold and smile in the same expression of face, and yet you never could feel but what the smile overcame the scold It was that peculiarity, that phase of his character, that made him the man you thought your best friend the first time you met, and you knew because he would do anything to help you He did more in encouraging younger men than anyone I ever met He would see an article of merit and even if he did not know the man who was the author he would write him an encouraging letter That is another phase

It so happened that after graduation I was asked to attend the weekly clinic of Doctor Osler at the Orthopaedic Hospital After the clinic was over and the patients were gone Doctor Osler would throw himself back in his chair and talk to his assistants One day we happened to be alone and he had a heavy cold Without noticing that I was being quizzed, he asked me what he should do for his cold, and I glibly answered with H C Wood's therapeutics Wash out the mouth and gargle the throat with a mixture of a decoction of *rhus glabra* and potassium chloride, then go home and soak the feet and go to bed, take a Dover's powder and hot lemonade Then I saw Doctor Osler's Egerton-Yorrick-Davis's smile beginning to come over his face and he said, "I do nothing for a cold" He just wanted to draw me out to impress on me the fact that Natu

day I started to bring out a blue line on the gums in a suspected case of lead poisoning before it appeared spontaneously, Osler was my only friend when the fumes of sulphuretted hydrogen permeated the hospital I would not advise you to carry out the procedure too near the hospital wards, but it works much better than does Bergeron's method in phthisis!

In one of these talks Doctor Osler told me that he had a patent foramen ovale and had been rejected on that account by an insurance company

Now for a word concerning that celebrated Osler speech made February 22, 1905, about the so-called chloroforming of people over sixty For one of the few times in his life, Osler made a mistake in regard to the age for retirement from active work He referred in his lecture, and again in his collection of twenty-three essays in *Aequanimitas* in which he confirms his opinion, to the belief that the best work in the world is done when persons are under sixty, and that after that age it would be better for themselves and the world if they did nothing further The idea was taken from Anthony Trollope's, *The Fixed Period*, and was written anonymously and appeared in a magazine about a year before the address, I found in the book that the age at which they were to retire, previous to *Exitus* a year later, was sixty-seven—not sixty

Doctor Edward Willard Watson, of Philadelphia, once called my attention to the fact that after his Washington Birthday Address he was in the office of his great friend, George M Gould, and was shown a dispatch that had just arrived from Doctor Osler asking *American Medicine* to contradict certain sensational statements then appearing in the daily press On going to the library several days later I found a Gould editorial on "Oslerizing" published on page 337 of the March 4, 1905, issue of *American Medicine*, in which was a reproduction of this telegram "Contradict, please, in *American Medicine*, that I advise chloroform for men over 60 (Signed) Wm Osler" This is evidently one of the few cases where Osler "broke his silence" in regard to this matter

It was utterly impossible to come in contact with Osler without learning something new, and without his leaving a valuable thought with you You all know, of course, about his bookshelf and you all know about his veneration for the *Religio Medici*, but you may not

know that while in Philadelphia he strongly recommended two books which I believe could be read today with the greatest of benefit. They are Lazarus Barlow's book on Pathology, in which he takes up this subject from a different standpoint than any other book, and Findlayson's *Clinical Diagnosis*. I would say if we were forced to give up laboratory medicine and had to return to the old method of sight, sense, and touch, then in use, that this book would be one of the best sellers.

In going over the literature of Doctor Osler's writings, in which I handled several thousand books and pamphlets, for Doctor Maude E. Abbott's interesting Sir William Osler Memorial Volume, *Bulletin No. IX, International Association of Medical Museums*, 1927, the following extracts were found. Can any of our readers locate the source? The first one is not a Davis yarn as is the one on "Vaginismus" which got into literature via the *Index Medicus* and the *Catalogue of the Surgeon General's Office of the United States Army*. Here is what Doctor Osler wrote:

"Mr. Fred Brydges had kindly met our party in 1886 at the portage to take us over the Manitoba and North Western Road, and he mentioned that two days before, a woman, while in the water-closet on the train, had given birth to a child, which had dropped to the track and had been found alive some time after I was so incredulous that he ordered the conductor to stop the train at the station to which the woman had been taken that I might see her and corroborate the story. I found mother and child in the care of the stationmaster's wife, and obtained the following history. She was aged about 28, well developed, of medium size, and had had two previous labors which were not difficult. She had expected her confinement in a week or ten days, and had got on the train to go to see her husband who was working "down the track." Having a slight diarrhoea she went to the water-closet, and while on the seat labor pains came on and the child dropped from her. Hearing a noise and groaning, the conductor forced open the door and found the woman on the floor in an exhausted condition, with just strength enough to tell him that the baby was somewhere on the track, and to ask him to stop the train, which was running at the rate of about 20 miles an hour. The baby was found alive on the side of the track a mile or more away, and with the mother was left at the station where I saw her. She lost a good deal of blood, and the placenta was not delivered for some hours. I saw no reason to doubt the truthfulness of the woman's story, and the baby presented its own evidences in the form of a large bruise on the side of the head, another on the shoulder, and a third on the right knee. It had probably fallen between the ties on the sand, and clear of the rail, which I found, on examination of the position of the hole in the closet, was quite possible."

In Philadelphia it was currently reported that Doctor Osler had confined the woman in the water-closet!

Here is the report in a medical journal of an after-dinner speech delivered by Doctor Osler

"It may not be known that part of the reason I love my fellow practitioners in the country rather more than my fellow practitioners in town is that I narrowly escaped being a country doctor. I was brought up in the office of a country doctor, and he has often told me that the saddest hours of his life were those he spent while I was his office student. I never did appreciate drugs, and didn't even understand the importance of keeping each one in its proper place, but generally managed to put the morphia bottle where the quinine ought to be, so my preceptor had difficulty in the dark to find them, and on one occasion he nearly poisoned his best patient. What determined me that I was not capable of being a country doctor is this. A week after my graduation my preceptor was compelled to leave home for a while, and I was called one dark night way back in the country to attend a primipara. My, I had a sad time, an awfully sad time, but oh, the woman had a worse time. It gives me a cold shudder still to think that before that woman was delivered I had nearly all the country practitioners in the neighborhood summoned. I determined, Sir, that I would never, under any circumstances, wait so long for assistance in a case I didn't know anything about, and I can sympathize with the country doctor when placed in similar circumstances."

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